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THE ATLANTIC CITY MEETING OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE AND ASSOCIATED SOCIETIES

Edited by Dr. BURTON E. LIVINGSTON
GENERAL SECRETARY

THE MEETING IN GENERAL

THE Atlantic City meeting, which opened on Tuesday evening, December 27, and closed on Saturday, December 31, was the ninety-first meeting of the American Association. While not to be accounted among the largest meetings, this meeting was very successful in every way. Never before had the association met in Atlantic City.

Attendance was estimated as above 3,000. Since many of those who attend our meetings neglect to register, not having railway certificates for validation and not requiring either badge or General Program, it is increasingly difficult to secure anything approaching an actual count. Most of the societies that meet with the association are unable to furnish accurate information concerning attendance at their meetings. The actual registration was 2,066. Of these, 565 came from New York State, 238 were from Pennsylvania, and New Jersey, Massachusetts, the District of Columbia and Maryland sent 178, 177, 172 and 126, respectively. Other states that sent more than 30 were Connecticut (87), Ohio (63), Illinois (44), Virginia (40) and Michigan (34). There were 20 registrants from California, 23 from Maine, 4 from Florida and 2 from Washington. A peculiar aspect of this meeting is illustrated by the fact that only 8 persons registered as from Atlantic City.

This meeting was unusual in the manner of its preparation, for there was no local committee. Local arrangements were made through Mr. A. H. Skean, director of the Atlantic City Convention and Publicity Bureau, for whose very efficient and friendly

help the association is deeply grateful. Many Atlantic City hotels furnished session rooms and other facilities, which proved highly satisfactory. The Haddon Hall Hotel was general headquarters, and it was unusually satisfactory. In the Municipal Auditorium unusually adequate space was provided for the science exhibition and the registration offices. Some of the general sessions were held there and also the sessions of several of the special scientific societies. The association is glad to express its appreciative thanks to Mr. Lincoln G. Dickey, director of the auditorium. The sessions of each society were in most cases held in the hotel that was designated as headquarters for that society, and many members were able to attend their society sessions without leaving the hotel in which they had lodgings. Meeting places were all situated on the Boardwalk and distances were not excessive; although taxicab rates were regarded as outrageously high, the taxi service was excellent. Jitney busses gave convenient and rapid transportation at a very reasonable rate.

It is a great pleasure to acknowledge with grateful appreciation the valuable aid given by the Bausch and Lomb Optical Company, the Spencer Lens Company, E. Leitz, Inc., the Eastman Kodak Company and the International Projector Corporation, who placed at the disposal of the association, for use at the many sessions, projection apparatus and microscopes valued at over $10,000.

This meeting encountered no cold weather, although there was considerable rain and mist or fog. Almost every one took exercise and found relaxation in walks along the Boardwalk, with the open sea on one hand and the hotels and shops on the other. It was indeed unusual to have all the meeting places almost within hearing of the perpetual roar and splash of the surf upon the beach.

The General Program, a book of over 200 pages, provided with summary and author index, was edited by Sam Woodley. Copies may be had on request addressed to the Washington office of the association.

Many of the lectures, addresses and scientific contributions given at this meeting, of which there were over 1,500, will appear in the pages of SCIENCE. Most of the technical contributions and some of the more general papers will be published in the journals devoted to the special sciences. In a number of instances those journals have already published abstracts. The American Association does not attempt responsibility for these publications, and any one interested in papers mentioned in this report or listed in the General Program may well write directly to the respective authors, to learn when and where their papers are to be published. But the forthcoming volume reporting Section K's symposium on "The Stabilization of Employment," which will be specially timely and authoritative, constitutes an exception to the general rule; it may be ordered from the Washington office of the association. (See Section M, in this issue of SCIENCE.)

Besides the American Association as a whole and its fifteen sections, about forty associated or invited organizations took part in the ninety-first meeting. These are named in the summarized reports farther on.

Dr. John J. Abel, of the Johns Hopkins University, was president for this meeting. His research work in some of the most difficult fields of pharmacology is known throughout the world and very many eminent scientific workers were guided and inspired by him in their earlier years. Dr. Abel led a symposium on Wednesday afternoon, under the auspices of Section N (Medical Sciences), on "Present Knowledge of the Hypophysis Cerebri."

The retiring president for the Atlantic City meeting was Dr. Franz Boas, of Columbia University, who is called the dean of American anthropologists. His retiring presidential address was given at the opening session Tuesday evening, on "The Aims of Anthropological Research." The address was published in SCIENCE for December 30.

The opening session of the meeting was held on Tuesday evening, at the Municipal Auditorium. Mr. A. H. Skean welcomed the association to Atlantic City, and Professor L. P. Eisenhart, of Princeton University, spoke some appropriate words of welcome for the State of New Jersey. President John J. Abel replied on behalf of the American Association and then introduced the speaker, Retiring President Franz Boas. The general reception was held in the Vernon room of the Haddon Hall Hotel, following the opening session.

Of less strenuous nature, but not less valuable than the scientific and business sessions, were the numerous dinners, luncheons, breakfasts and smokers, arranged by the various organizations, which were generally very well attended at Atlantic City. In addition to these, there were several field or inspection trips.

BUSINESS PROCEEDINGS AT ATLANTIC CITY

By unanimous vote at the general session held on Thursday evening, December 29, Article 4 of the constitution was amended to provide for council representatives from the divisions. The amended article reads as follows: "The Council shall consist of the president, the vice-presidents, the permanent secretary, the general secretary, the secretaries of the sections, and the treasurer, of one fellow elected by each division, affiliated state academy and affiliated society, and one additional fellow from each affiliated society

having more than 100 members who are fellows of the Association, and of eight fellows, two elected annually by the Council for a term of four years."

The executive committee met on Monday evening and Tuesday morning, also following the council sessions on Wednesday, Thursday and Friday mornings. The council met on Tuesday afternoon and Wednesday, Thursday and Friday mornings. Chairmen for these four sessions were, respectively: Dugald C. Jackson, Charles Zeleny, Burton E. Livingston and Dugald C. Jackson. Items of business were transacted as follows:

1. The privileges of the Atlantic City meeting were cordially extended to Dr. W. F. G. Swann, official representative of the British Association for the Advancement of Science.

2. The audited financial reports of the treasurer and of the permanent secretary for 1931–32 were accepted, also the permanent secretary's report on membership, as of September 30, 1932. (Some notes on these reports are presented in the next following section of this general report.)

3. Balanced budgets for 1932–33, proposed by the treasurer and by the permanent secretary, were approved.

4. The permanent secretary reported a bequest of $500 from Miss Luella Agnes Owen, of St. Joseph, Missouri, who died on May 31, 1932, after many years of membership in the association. The council expressed its great appreciation of this bequest and voted that it should be the nucleus of an endowment fund, the income from which is to be used for creating emeritus annual memberships in the association.

5. The council voted that the fees of all deceased emeritus life members be transferred from the general fund of life-membership fees to the Jane M. Smith fund, and that, in future, this transfer is to be made as emeritus life members become deceased. (The Jane M. Smith fund is a bequest of $5,000, the income from which is used annually for the establishment of emeritus life memberships. The principal is now increased to $7,500.)

6. William Matlack (M '78), William Fellowes Morgan (M'78, F '32) and Nathaniel Lord Britton (M '78, F '82) were elected to emeritus life membership.

7. The sum of $300, of the treasurer's available funds (principally income from the Jane M. Smith fund for 1931–32) was appropriated for the three emeritus life memberships just mentioned.

8. The council appropriated research grants from treasury funds as follows: Henry B. Ward, a sum not to exceed $800; Charles F. Roos, $1,000; H. T. Stetson, $500; for allotment by the Committee on Grants, $700.

9. An appropriation of $1,000 from treasury funds was made as an honorarium for the executive secretary of the Committee on Foreign Guests at the approaching Chicago meeting.

10. An appropriation of $1,000 was made from the prize fund, for the Atlantic City prize.

11. For journal subscriptions of living life members for 1933, an appropriation of $1,539 was made from treasury funds, also an appropriation of $22 from treasury funds for rent and tax on the treasurer's safety-deposit box.

12. The council voted that $2,000 of the permanent secretary's funds now in the treasury be appropriated for use by the permanent secretary's office if and as needed.

13. Forty-nine fellows were elected by the council.

14. On recommendation of the Secretaries' Conference and of the executive committee, the council voted that members whose names appear in the fifth edition of "American Men of Science," which is about to be published, shall be elected to fellowship, if not already fellows; provided that if objection be raised against any name it shall be referred to the proper section committee for recommendation to the executive committee.

15. The council voted that non-members whose names occur in the fifth edition of "American Men of Science" shall be invited to join the association with the expectation of being elected to fellowship.

16. The council voted unanimously that, in view of information received from the American Medical Association, the membership of John R. Brinkley is discontinued.

17. The council voted that the Western Society of Engineers be invited to become officially associated with the American Association.

18. The committee on grants for research was asked to present a full report on the results of its study of the general question, How may the American Association best employ the funds annually becoming available for "research" or "for the advancement of science," so as to accomplish the most good?—It has been repeatedly suggested that these relatively small funds might perhaps better be employed in other ways than through individual grants in aid, and this entire question is open for discussion. It is desirable that thoughts and suggestions on this topic be sent to the permanent secretary for transmission to the committee on grants.

19. The council voted that the committee on the place of science in education be reorganized, with the following membership: Otis W. Caldwell (*chairman*), Karl T. Compton, E. R. Hedrick, Jerome Isenberger, Burton E. Livingston, Morris Meister.

20. The council voted with great regret to accept the resignation of Dr. Rodney H. True as secretary of the Committee of One Hundred on Scientific Research and expressed its keen appreciation of the valuable services rendered by Dr. True throughout his period as secretary of that committee.

21. The council accepted a report of the committee on source books in the history of science.

22. A report was accepted from Dr. Herbert Osborn, representative of the American Association on the Board of Trustees of *Biological Abstracts*.

23. The council named Philip Fox and Henry B. Ward as additional members of the committee on foreign guests for the Chicago meeting.

24. Dr. Philip Fox was elected executive secretary of the committee just mentioned.

25. The council accepted with thanks an offer of the sum of $500 from Dr. Duren J. H. Ward, of Denver, Colorado, for the purpose of organizing for the Chicago meeting a symposium on anthropological or sociological science as related to the advance of civilization.

26. Dr. Waldo G. Leland was named as a committee to organize the symposium just mentioned.

27. The council named Professor Roy E. Clausen (University of California) as chairman of the local committee on arrangements for the Berkeley meeting, to occur in the summer of 1934.

28. It was voted that the winter meeting of 1935–36 be at St. Louis, Missouri, provided satisfactory arrangements can be made.

29. The council elected officers at its session Friday morning. These elections have been published in SCIENCE for January 6.

30. The executive committee elected J. McKeen Cattell to succeed himself as its chairman, for the term ending with 1936.

31. The council accepted and adopted the following recommendation from the executive committee: In view of the approaching retirement of Dr. Henry B. Ward from the headship of the Department of Zoology of the University of Illinois, and in view of Dr. Ward's distinguished work for the advancement and organization of science, including his active participation in the work of the association and this executive committee, the committee regards it as fortunate that it is able to recommend him for election to the permanent secretaryship. It is understood that a portion of his time may be reserved for his research work.

32. In accordance with the recommendation just quoted, the council voted that the salary of the permanent secretary is to begin June 1, 1933.

33. Burton E. Livingston was nominated to succeed himself as a member of the Board of Trustees of Science Service, for the term ending in April, 1936.

34. Irving Fisher and W. F. Ogburn were appointed as a special committee to encourage and arrange for meetings of societies devoted to the social sciences in connection with the approaching Chicago meeting of the American Association.

35. The council adopted the following resolution of appreciation and thanks: At the close of the first Atlantic City meeting, which has brought together a large group of scientific workers and a wide variety of societies, effectively carrying out an extended program of over 1,500 scientific papers and discussions, the Council of the American Association for the Advancement of Science wishes to record its appreciation of the many excellent and efficient provisions made for the success of this meeting by the Atlantic City Convention and Publicity Bureau, and of the personal interest shown in caring for every detail by the director of the bureau, Mr. A. H. Skean, who, in addition to the usual duties of his position, has discharged in a large measure the functions of chairman of a local committee. Atlantic City contributed to the success of this meeting in many ways, especially through the unusually fine facilities of the magnificent Municipal Auditorium, made available through its director, Mr. Lincoln G. Dickey. The cordial thanks of the American Association and the scientific societies that met with it at Atlantic City are due to the several headquarters hotels, which provided so well for meeting places and society dinners. The Council further desires to acknowledge with hearty appreciation the services of the representatives of the press, who handled so effectively the large number of science news items that became available at the various Atlantic City sessions.

GENERAL OFFICERS OF THE ASSOCIATION

The names of officers elected at Atlantic City have been published in SCIENCE for January 6, 1933. The names of the general officers for the ensuing year are shown below, for convenience of reference.

President, Henry Norris Russell, Princeton University.

Retiring president, John J. Abel, Johns Hopkins University.

Permanent secretary, Henry B. Ward, University of Illinois.

General secretary, Burton E. Livingston, Johns Hopkins University.

Treasurer, John L. Wirt, Carnegie Institution of Washington.

Executive Committee: J. McKeen Cattell (Garrison-on-Hudson, N. Y.), Karl T. Compton (Massachusetts Institute of Technology, Cambridge, Massachusetts), David R. Curtiss (Northwestern University, Evanston, Illinois), Philip Fox (Adler Planetarium and Astronomical Museum, Chicago), Joel T. Hildebrand (University of California, Berkeley, California), Burton E. Livingston (Johns Hopkins University, Baltimore, Maryland), Robert A. Millikan (California Institute of Technology, Pasadena, California), Henry Norris Russell (Princeton University, Princeton, N. J.), Henry B. Ward (University of Illinois, Urbana, Illinois), Edwin B. Wilson (Harvard School of Public Health, Boston, Massachusetts), A. F. Woods (U. S. Department of Agriculture, Washington, D. C.).

Director of Press Service, Austin H. Clark, U. S. National Museum, Washington, D. C.

Executive Assistant, in charge of Washington office, Sam Woodley, Smithsonian Institution Building, Washington, D. C.

MEMBERSHIP AND FINANCIAL REPORTS

At the beginning of the year paid-up membership was 18,269 (the largest membership in the association's history) and it was 17,444 at the end; the net loss amounting to about 4.5 per cent. Paid-up memberships amounting to 1,397 were added during the year, but 315 of these were for only one half year. Twelve new life memberships were received during the year, and 20 additional ones have been received between September 30 and December 31.

Because names of members whose dues are not paid are retained on the roll until there is an arrearage for two years, it has been customary to employ "total enrolment" in appraising the growth of the organiza-

tion, but those who are in arrears for a year or more ought not to be considered as *bona fide* members. There were 1,620 of these unpaid enrolments at the beginning of the year and 2,221 at the end; 789 of these were dropped on October 1, at the beginning of the present association year.

The audited report of the treasurer for the year 1931–32 is of special interest because of the Hector Edward Maiben bequest, from which the treasurer received $2,353.17 in cash, and securities appraised at $29,095.

The late Hector Edward Maiben was a sustaining member for about ten years before his death. A Nebraska farmer, with little formal education, but nevertheless very well educated through lifelong omnivorous reading, he was especially interested in the broader aspects of scientific research and in the advancement of knowledge. In memory of Mr. Maiben the Association Council has established the Maiben Lecture as an important feature of the annual meetings.

On September 30 the treasurer held endowment funds amounting to $200,774.83, according to cost or appraised values of the securities when acquired. He held also $35,010.81 of available but unappropriated fiunds accumulated in previous years, comprising $15,030 of permanent secretary's funds, $15,980.81 of treasury reserve and the prize fund of $4,000 (reserved for four annual prizes of $1,000 each, including the Atlantic City prize). The average rate of interest received in 1931–32 from the treasurer's funds was 4.8 per cent., a very satisfactory rate, for which the treasurer, the finance committee and the association are to be congratulated.

The permanent secretary's financial report for 1931–32 shows receipt of annual dues and entrance fees for the current year, amounting to $83,766.60. Delayed payments for earlier years and advance payments amount to $1,414.48. For life-members' journal subscriptions $1,548 was received from the treasurer. The amount paid to the publishers of SCIENCE for members' journal subscriptions was $52,601.09. Division allowances and allowances to affiliated academies amounted to $3,929. Circularization for new members cost $3,344.17. Travel expenses, *per diem* allowances and section expenses amounted to $4,799.16. Income from the New Orleans meeting was $8,658.51, and the cost of that meeting was $13,032.93. Corresponding items for the Syracuse meeting are $1,776.45 and $2,234.94. General expenses of the permanent secretary's Washington office amounted to $24,756.59.

At the beginning of the year the permanent secretary's generally available funds amounted to $22,886.85, and these had been decreased to $14,849.50 at the end of the year. Additional permanent secretary's funds for special purposes (amounting on September 30 to $4,793.48) do not require special consideration here.

It is to be noted that the permanent secretary's reserve of generally available funds (which had been accumulated in past years, when income from dues, meetings, etc., surpassed outgo) was decreased by $8,037.35 in 1931–32. The reserve was planned to care for special projects or for depression periods and it has been a veritable life-saver, allowing the work of the association to be maintained as usual in spite of "hard times." Locally raised funds for recent meetings have fallen far short of covering the costs of those meetings, and research exhibits at the annual science exhibition have been increased in number and value, although that part of the exhibition produces expenses and gives no financial income. It is fortunate that this very important feature of the meetings might be continually enlarged and improved at New Orleans and at Atlantic City. The decrease in generally available reserves mentioned above is not to be regarded as a deficit in any real sense, for the association is not a commercial organization and any reserves that accumulate should eventually be used to insure excellent meetings and to further the work of the organization in other ways.

On September 30 the appropriable funds of the association were as follows:

Permanent secretary's accumulated available funds	$15,030.00
Treasurer's accumulated available funds	15,980.81
Treasurer's income for 1931–32	8,321.87
Permanent Secretary's funds for specific purposes	4,793.48
Prize fund	4,000.00
Total	$48,126.16

Appropriations made subsequent to September 30 are as follows:

Research grants, from treasurer's funds:	
Henry B. Ward, not to exceed	800.00
Charles F. Roos	1,000.00
H. T. Stetson	500.00
For allotment, to be decided by the Committee on Grants	700.00
Honorarium for executive secretary of Committee on Foreign Guests at Chicago Meeting (Philip Fox)	1,000.00
Three emeritus life memberships (income mainly from Jane M. Smith fund)	300.00
Life membership journal subscriptions	1,539.00
Treasurer's safe-deposit box (including tax)	22.00
Atlantic City Prize	1,000.00

Excepting the prize, which is derived from the prize fund, these appropriations are all from the treasurer's

income for 1931–32, the balance of which may consequently be taken as $2,460.87, on December 31, 1932.

The executive assistant, Sam Woodley, of the Washington office, reported several important economies instituted during 1931–32, among which may be mentioned: a saving of over $1,000 in connection with the securing of nominations for fellowship, a saving of about $1,100 through the use of unsealed envelopes for billing and for circularization for new members (postage, 1½ cents instead of 2 cents), a saving of about $450 in connection with the editing of the General Program of the Atlantic City meeting, and savings of about $300 due to changes and modifications in office routine.

At the Atlantic City meeting a new endowment fund was started, consisting, at present, of $500, the recent bequest of Luella Agnes Owen. To this, it is hoped, additions may be made from time to time. The income from this fund is to be used for creating emeritus annual memberships.

By action of the council at Atlantic City, the fees of deceased emeritus life members are now added to the principal of the Jane M. Smith fund, increasing it from $5,000 to $7,500. On December 31, 1932, there were 53 living emeritus life members, including the three just elected to that honor.

SCHEDULE OF PROPOSED MEETING PLACES

Chicago, Ill.	Monday, June 19, to Friday, June 30, 1933.
Boston, Mass.	Wednesday, December 27, 1933, to Tuesday, January 2, 1934.
Berkeley, Calif.	Summer, 1934.
Pittsburgh, Pa.	Thursday, December 27, 1934, to Thursday, January 3, 1935.
Minneapolis, Minn.	Summer, 1935.
St. Louis, Mo.	Friday, December 27, 1935, to Thursday, January 2, 1936.
Rochester, N. Y.	Summer, 1936.
Washington, D. C.	Monday, December 28, 1936, to Saturday, January 2, 1937.
Denver, Colo.	Summer, 1937.
Indianapolis, Ind.	Monday, December 27, 1937, to Saturday, January 1, 1938.

THE SECRETARIES' CONFERENCE

The Atlantic City session of the Secretaries' Conference was held on Tuesday afternoon. It followed the Secretaries' Luncheon, which was provided by the American Association, and adjourned so that conference members might attend the first council session. Over thirty of the conference members were in attendance and the only regret concerning this session was that the time allowed for it was not as great as might perhaps have been profitably used in discussion. Dr. P. E. Brown is chairman and Dr. Mark H. Ingraham (University of Wisconsin) is secretary of this conference for 1933.

The Secretaries' Conference acts as a sort of standing committee of the association, to consider and to make recommendations to the executive committee and the council concerning relations between the association and the societies that meet with it. Its membership consists of (a) the secretaries of the association sections, (b) the secretaries of the associated societies and of other societies meeting with the association, and (c) the members of the executive committee. The Atlantic City session was mainly devoted to a discussion of the general problem concerning fellowship in the association, which followed a thoroughly studied report on this somewhat vexed question, presented by Dr. George T. Hargitt (Duke University), secretary of Section F. The conference recommended to the council that fellowship be retained as depending upon professional engagement in scientific work, not as an honor conferred for outstanding contributions or scientific eminence. It also recommended the discontinuance of the rather elaborate system by which fellowship nominations have been secured in recent years (at a cost to the association of about $1.50 per nomination, or over $1,000 per year, entailing much work on the part of members of the section committees and of the permanent secretary's staff). Constructively, it recommended that members not yet elected to fellowship whose names occur in the fifth edition of "American Men of Science"—which is about to be published—shall be eligible to fellowship unless objections are raised in individual cases. The council subsequently adopted this recommendation, adding that, in case of objections, these shall be referred to the proper section committee in each instance, for recommendation to the executive committee. Special arrangements may be required for fellowship nominations in some sections. Nominations may still be made by any three fellows, on blanks provided by the Washington office.

THE ACADEMY CONFERENCE

The Academy Conference acts as a sort of standing committee of the American Association, to facilitate cooperation among the affiliated academies and between them and the association. This conference is composed of the academy representatives in the council of the association (one for each affiliated academy) together with three members representing the association as a whole. Academy affiliations with the A. A. A. S. are now 26 in number, as follows: Alabama, Colorado-Wyoming, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Michigan, Nebraska, New Hampshire, New Orleans, North Caro-

lina, North Dakota, Ohio, Oklahoma, Pennsylvania, St. Louis, South Carolina, Tennessee, Texas, Virginia, West Virginia, Wisconsin, Northwest Scientific Association.

The Academy Conference held its usual session on Tuesday afternoon, following the first session of the council. The members of this conference then dined together, at the annual Academy Dinner, provided by the American Association. The secretary of the conference, S. W. Bilsing (Texas Academy), was unable to be present on account of sickness in his family, and Miss Mary T. Harman (Kansas Academy) acted as secretary *pro tem.* For the ensuing year Howard E. Enders (Indiana Academy) is chairman of this conference and Emmett B. Carmichael (Alabama Academy) is vice-chairman. S. W. Bilsing was elected secretary for the ensuing 4-year term, to succeed himself. Dr. A. C. Walton (Illinois Academy) read a valuable paper on the practises of the affiliated academies in accepting papers for their programs and for their publications. A general discussion followed.

By special invitation, Dr. Otis W. Caldwell (Columbia University), chairman of the conference's committee on junior science organizations, read a report on the activities of high-school science clubs in New York City. Science clubs aid the advancement of science by starting at the beginning, as it were—aiming to discover and encourage young people who show capacity for later work in science, and to transmit to them at an early stage of their development some of the attitudes of mind and points of view of those who have led scientific advance in the recent past.

Following Dr. Caldwell's paper Dr. Enders spoke on pins adopted as insignia for the junior academies of Illinois and Indiana. The Academy Conference voted to recommend to the various state junior academies that pins of the type used in Illinois and Indiana be adopted, so that there might be uniformity in this respect among junior academies as well as distinguishing marks. Brief reports on junior academy work were presented from the following affiliated academies: Illinois, Indiana, Iowa, Kansas, North Carolina, Ohio, West Virginia, Kentucky, Alabama and Virginia.

A full report of the Atlantic City session of the Academy Conference will soon be sent to all conference members and to the secretaries of the academies that are affiliated with the American Association. Others may receive copies of the report for the asking, if they will send their requests promptly to the permanent secretary's office, Smithsonian Institution Building, Washington, D. C.

THE PRESS SERVICE

(By Austin H. Clark, director, A. A. A. S. Press Service)

From the point of view of the Press Service, the Atlantic City meeting was the most successful in the history of the association. The Press Service desires most cordially to thank the members of the association and of the associated and affililated societies for the excellence and abundance of the material submitted in advance of the Atlantic City meeting, and also for the careful manner in which it was prepared. It desires also to express, to the many press representatives who took part in covering this meeting, the hearty and appreciative thanks of the association and its members. Especially gratifying was the fact that the great majority of the manuscripts and abstracts bore the date and hour of delivery, making it possible to provide them with release dates immediately upon receipt. This resulted in a very appreciable saving for the association, for the marking of release dates on papers submitted without the date and hour of reading means a considerable expenditure of time in searching through the manuscript of the program, and a corresponding outlay for clerical assistance. This year a minimum of clerical assistance was necessary at Washington in advance of the meeting, and none at all at Atlantic City. So large was the volume of excellent material sent in that all of it could not possibly be noticed in the press during the week of the meeting. But everything available for press notice will eventually be used.

THE ANNUAL SCIENCE EXHIBITION

The science exhibition was arranged in the grand ballroom of the Municipal Auditorium. The committee on exhibition, and especially Dr. F. C. Brown, chairman of the committee and director of the exhibition, are to be congratulated on the extent, diversity and general excellence of this year's exhibits. It seems to this reporter that the Atlantic City exhibition was the most satisfactory one thus far held. There was an excellent research exhibition at the fourth New York meeting (December, 1916) but a continually improving series of efforts in this direction, with both commercial and research exhibits, had its start at the second Toronto meeting (December, 1921). The Atlantic City exhibition was the twelfth of the series.

A specially useful feature, introduced this year, was the Science Library, a collection of scientific books published in 1932; through the cooperation of 34 publishing houses over 300 volumes were thus available for examination. Another new feature of this exhibition was a series of short afternoon talks, at about 4:30 o'clock by men of science on their

avocations or hobbies. David E. Smith (Columbia University) told about Oriental book collecting, Dayton C. Miller (Case School of Applied Science) talked on the development of the flute, illustrating his remarks by means of about 40 flutes selected from his collection of these instruments, which is the most complete in the world. C. N. Hickman (Bell Telephone Laboratories) spoke on the history of archery and showed, with demonstrations, how science may enhance the interest one has in that art. Austin H. Clark (U. S. National Museum, manager of the A. A. A. S. Press Service) spoke about butterflies and butterfly collecting. W. F. G. Swann (Bartol Research Foundation) illustrated cello playing as a pleasant hobby for a professional physicist.

The exhibition included exhibits as follows: U. S. Bureau of Entomology (Mexican bean beetles and surgical maggots); American Museum of Natural History (flattened skulls from Venezuela, new-type dinosaur from Montana, ultra-violet patterns of butterflies, muscular anatomy of the foot in bear, gorilla, chimpanzee and man, glass models of rotifers, etc.); Bartol Research Foundation of the Franklin Institute (recording instruments for study of cosmic rays, a cosmic-ray hodoscope); Bausch and Lomb Optical Co. (many types of microscopes and other apparatus for research and teaching); Charles Bittinger (color paintings of solar spectrum, eclipse corona, etc.); P. Blakiston's Son and Co. (several hundred scientific publications); Calibron Products, Inc. (physical apparatus); California Institute of Technology (x-ray fluoroscope and other research apparatus); Carnegie Institution of Washington (measurement of velocity of light, new photographs from Chichen Itza); University of Chicago Physical Laboratory (apparatus used in field study of cosmic rays); Hugh U. Clark and Leila G. Forbes (unrecorded manuscript map drawn by Henry Livingston, 1788, showing prehistoric Indian earthworks in Ohio); Clay Adams Company (biological models, charts and specimens for teaching); Columbia University, Botany Department (models of geometric cell forms); U. S. Coast and Geodetic Survey (automatic recording accelerometer); U. S. Bureau of Fisheries (research on vitamins in fish products, especially vitamin D in canned salmon and mineral content of oysters as related to prevention and cure of nutritional anemia); U. S. Bureau of Standards (unusual forms of familiar substances —water with excess of hydrogen isotope two, bubbles of mercury like soap bubbles, etc.); Fleischmann Laboratories (production of vitamin-D milk by feeding cows with irradiated dry yeast); Field Museum of Natural History (evolution of the horse, birds of western China and of Chile, the Mayan solar year, fossils from Labrador, reptiles and amphibians from Venezuela and from Solomon Islands, Asiatic mammals, etc.); Ford Motor Company (Johannsen gauges); R. Fuess, Inc. (apparatus for spectrum analysis, new meteorograph, etc.); General Electric Company (incandescent lamps for special uses); Gradwohl School of Laboratory Technique (parasites and parasitic diseases, etc.); Johns Hopkins University, Chemistry Department (models of molecules); Johns Hopkins University, Plant Physiology Department (radio-atmometers, especially newly developed black porous-porcelain spheres, and summer graphs of evaporation and sunshine); Kellogg Company (cereal preparations and Kaffee Hag); E. Leitz, Inc. (new colorimeter, new inverted microscope, Leitz ultropak, etc.); Lilly Research Laboratories and Johns Hopkins University (comparative studies on toad poisons); Linguaphone Institute (linguaphone courses in 18 different languages); McGraw-Hill Book Company (recent publications); Massachusetts Institute of Technology (portable Van de Graaff generator, evolved from old static machine, etc.); University of Missouri (purification of viruses); National Zoological Park (living Surinam toads); New Jersey Agricultural Experiment Station (solution culture and sand culture for growing standard plants); Rice Institute (Geiger-counter apparatus for cosmic rays, recording cosmic-ray electroscope, etc.); Smithsonian Institution (measurement of plant photosynthesis as related to light characteristics, CO_2 pressure, etc.); South Carolina Food Research Commission (vitamin contents of various foods); Spencer Lens Company (microscopes and other optical instruments); U. S. Public Health Service (nature and prevention of the disease pellagra); University Presses—Chicago, Oxford, Stanford, Yale (recent publications); D. Van Nostrand Company (scientific and technological books); University of Virginia (growth of nerves); Warren-Knight Company (lettering guides); Waukesha Motor Company (study of motor fuels); W. M. Welch Manufacturing Company (laboratory apparatus and equipment); Weston Electrical Instrument Corporation (electrical measuring instruments, etc.); Williams and Wilkins Company (scientific books and periodicals); Yale University, Institute of Human Relations (testing apparatus, alertness and personality tests, etc.).

The American Association is glad to express its appreciative thanks to all who took part in this record-making science exhibition at Atlantic City.

THE NINTH AWARD OF THE ASSOCIATION PRIZE

Through the generosity of a member who prefers to remain anonymous the American Association has awarded the annual thousand-dollar prize eight times, and the Atlantic City award is the ninth. According to the rules, there is no open competition for the

prize, but all papers appearing in the General Program of an annual meeting are automatically eligible, excepting invited papers presented at general sessions and presidential and vice-presidential addresses, which are not eligible. No attempt is made by the committee on prize award to select "the best" paper, since satisfactory comparisons are not possible between different fields of science. The prize is awarded simply to the author of some very notable contribution. The donor of the prize funds desires to aid and encourage younger authors rather than to honor older men.

The Atlantic City prize was awarded to Dr. Henry Eyring, of Princeton University, for a paper on "Quantum Mechanics and Chemistry, with Particular Reference to Reactions Involving Conjugate Double Bonds," which was presented before Section C (Chemistry) on Thursday afternoon.

Dr. Henry Eyring and His Work

A chemist who thinks of chemical reactions in terms of contour maps, and of the speed of chemical processes in terms of the height of a mountain pass between one valley of reacting substances and the neighboring valley of reaction products, such is the recipient of the 1932 Prize offered by the American Association for the Advancement of Science. Had his subject been literature rather than science one might have attributed the development to vivid youthful impressions obtained when the young bachelor of mining engineering and master of science in metallurgy left the halls of the University of Arizona and crossed the Rocky Mountains to obtain the doctor's degree in chemistry in the University of California. We must, however, attribute the development to the impact of the newer ideas in mathematical physics upon a mind well trained not only in chemistry but also in physics and mathematics. His doctor's thesis in California was physical rather than chemical and dealt with ionization in various media produced by the alpha particles from polonium. Two years of post-doctorate effort as research associate to Professor Farrington Daniels in the University of Wisconsin brought Dr. Eyring into contact with the urgent problems of speed in chemical processes and in particular with the problem of molecular decomposition of nitrogen pentoxide, a process which apparently occurred at constant temperature at a velocity which was, to the first approximation, independent of its environmental medium.

As National Research fellow at the University of Berlin Dr. Eyring found in Professor M. Polanyi a kindred spirit with whom he could attack the problem of speed in chemical processes from a fundamental theoretical standpoint. There was a fortunate grouping of circumstances. Bonhoeffer and Harteck had just discovered para-hydrogen and were busily engaged investigating the velocities of interconversion of the ortho and para varieties. Such a problem was especially suitable to a quantum mechanical study for, at that time, the hydrogen molecule was the only one for which computation of the respective contributions of coulombic and interchange binding were available. Indeed, it was the existence of the non-classical interchange or resonance binding which was beginning to indicate the nature and magnitude of the valency binding. Briefly, Eyring and Polanyi explored the possible mechanisms by which para-hydrogen could be changed homogeneously into ortho-hydrogen and concluded that the easiest mechanism was that involving the interaction of an atom with a molecule. The problem resolved itself into a determination of the potential energy of a system of three hydrogen atoms at all distances R_1 and R_2 from each other. These energies, when plotted on a diagram with coordinates R_1 and R_2, gave a contour map of iso-energy lines representing a potential surface and consisting of two deep valleys separated by a saddle about 13 kilo cals. above the valley floors. It is this height of the mountain pass which is a measure of the activation energy of the process in question and determines the speed at which the reaction occurs. It was fortunate that simultaneous experiments in the Kaiser Wilhelm Institut gave Eyring confirmation of the approximate validity of his calculations and encouraged him to further enterprise.

The last two years have seen an extension of this method of approach to a wide variety of chemical problems. The rapidity of the development has made it necessary to make approximate and empirical assumptions which it will be necessary later to refine and make more precise. Dr. Eyring, however, impresses every one with the boldness of his approach to the undoubted difficulties which lie in his path. He justified his courage by the results presented at the Indianapolis meeting of the American Chemical Society in the spring of 1931, in which he showed that the element fluorine had a much lower rating as to reactivity than the previous chemical literature would indicate. Practically simultaneously von Wartenburg in Danzig showed that both molecular and atomic fluorine were relatively inert toward hydrogen at ordinary temperatures.

There were many problems at Princeton awaiting his arrival in September, 1931. During that year it had been shown in our laboratories that many molecules were adsorbed but slowly on surfaces important in technical catalytic reactions. With Mr. Albert Sherman, Dr. Eyring analyzed the problem of the speed of attachment of hydrogen to a charcoal surface and obtained results consistent with the concept of activated adsorption developed in Princeton and with

the capacity of charcoal to induce the para-hydrogen conversion at its surface. The problem of mechanism in the photochemical hydrogen-chlorine combination which had occupied experimental investigators for a hundred or more years was also examined by the theoretical method and was shown to yield results identical in nature with those to which recent experimental investigations were tending, more especially in the direction of anticipating a lack of influence of water vapor on the velocity of the process. Recently, under the stimulation of the approaching Atlantic City meeting, Eyring dived down an entirely new avenue of investigation. It may be regarded as a by-path from his study of adsorption at charcoal surfaces, but it is a fundamentally new attack on problems of alternative organic reactions in a given system. At the moment, the reactions are most elementary in their nature, but in this new field it is necessary to walk first before one can run. There are many other fields still to be explored, and Dr. Eyring has the temperament to enlist active cooperation.

In the early days of quantum mechanics one imagined that it might be mainly concerned in its chemical aspects with atomic and molecular structure. It has been Eyring's privilege to show to those who were interested, not so much in structure, but in the speed and mechanism of chemical reactions that they also must concern themselves with these new developments of mathematics and physics.—*Hugh S. Taylor.*

HENRY NORRIS RUSSELL, PRESIDENT ELECT OF THE AMERICAN ASSOCIATION

A truly encyclopedic knowledge of physical science is impossible at present, but Henry Norris Russell's scope approximates that. In the varied science of astronomy there are few fields to which he has not contributed. To physicists he is known for brilliant work in classification of spectra. He is a stimulating lecturer, to technical and lay audiences alike, and general readers are in his debt for regular accounts of astronomical progress. He took a leading part in preparing a general astronomical text. His acquaintanceship with scientific men is of the widest; on many committees he has strengthened liaison between diverse fields and assisted in formulating policies. Nor do these professional matters by any means exhaust his sympathy and energy.

He was born at Oyster Bay, New York, on October 25, 1877. His father, Alexander G. Russell, was born in Nova Scotia, of Scottish stock. His mother, Eliza Hoxie Norris, came of a line of New England sea-captains, and was born in Para, Brazil, where her father was temporarily resident as American consul. Both he and her mother showed strong interest in exact science.

At the age of 12, Henry Norris Russell came to the Princeton home of his mother's family. He took his A.B. at Princeton University in his twentieth year, late in the "golden nineties," which—it would now appear unjustly—have not been considered there a period of high intellectual attainment. Receiving his Ph.D. in astronomy from the same institution (under Young) in 1900, he spent 1902 through 1905 at Cambridge, England, first as research student at King's College, then as Carnegie research assistant at the observatory. He was recalled to Princeton as instructor in astronomy (1905) by E. O. Lovett, then head of the department; and in spite of other nations he remains at Princeton, as research professor, chairman of the department of astronomy, and director of the observatory. Among graduate students whom he and his colleague of many years, Professor Raymond Smith Dugan, have instructed are Joy, Shapley, Menzel, Dunham. Since 1921 he has been borrowed from Princeton for several months of every academic year by the Mt. Wilson Observatory as research associate.

Russell first attained general recognition by his work in the field of stellar constitution and evolution, about 1913. Starting from Hertzsprung's differentiation of red stars into giants and dwarfs, he organized the luminosity-type diagram—which shows relations between intrinsic brightnesses and the surface temperatures of stars. He gave physical interpretation to this now well-known picture by following lines suggested many years before by H. Lane and Sir Norman Lockyer. Subsequent developments in atomic physics, which could not have been foreseen, have invalidated Russell's theory, but the diagram itself has exercised controlling influence on the advance of stellar physics. He has continued contributing to this now very complex subject, and in the first Maiben lecture at the Atlantic City meeting of the A. A. A. S. he presented a critical summary of current knowledge. An earlier summary was given in a course of Lowell lectures in 1931. Early in 1923, as the direct result of arranging demonstrations of spectra for an undergraduate course, he became interested in the expanding subject of the relation of spectra to atomic constitution. In collaboration with F. A. Saunders he attributed the anomalous terms in the spectra of the alkaline earths to the joint action of two electrons, initiating the interpretation of complex spectra. He has taken an extensive part in the analysis of such spectra. Another series of papers deals with astrophysical applications of these principles and of ionization theory, culminating in a study of the composition of the sun's atmosphere (1929) and in studies of stellar spectra made in collaboration with W. S. Adams and Miss Moore.

In positional and dynamical astronomy, mention

may be made of his work on stellar parallax (published in 1911); on the photographic determination of the moon's place; and on dynamical parallaxes of double stars—the latest list by Russell and Miss Moore includes 1,777 objects. Photometric interests are represented by a discussion of the albedo of the planets and satellites (1916) and a series of papers on the determination of the elements of eclipsing variables (partly in collaboration with Shapley, then a graduate student). His war-work on airplane navigation also may be mentioned.

As first Terry lecturer at Yale, under the title "Fate and Freedom," Russell exhibited what future historians of the well-worn relationship of religion to science may describe as a last stand of the Calvinistic mechanist just before old dykes broke and the rising tide of indetermination blotted out his trenches—but he retires with honor since his thesis was that mechanism didn't matter. He has from time to time preached sermons in churches of various denominations.

Russell's honorary degrees are from Dartmouth—D.Sc., 1922—Louvain—Doctor, 1927—and Harvard—D.Sc., 1929. His medals include the gold medal of the R. A. S., the Lalande medal, the Draper, the Bruce and the Rumford. He served as vice-president of the mathematics-astronomy section of the A. A. A. S. in 1918, and as president of the American Philosophical Society in 1931–1932. He is a member of numerous other scientific societies and a foreign associate of the Royal Astronomical Society; he is chairman of the committee on stellar spectra of the International Astronomical Union, and a member of its committees on double stars, stellar parallaxes, stellar statistics, solar spectroscopy, stellar constitution and notations and units.

His work has been distinctly theoretical rather than observational. In 1908 he married Lucy May Cole, of New York; they have four children, of whom three are now in college. Travel is for him a ruling passion and he spent a sabbatical year with his family in Egypt and the Near East without visiting an observatory or reading an astronomical periodical.—*J. Q. S.*

THE NEWLY ELECTED PERMANENT SECRETARY

Dr. Henry B. Ward, the newly elected permanent secretary of the association, is to retire next June from his position as professor of zoology and head of the department of zoology at the University of Illinois. The American Association is very fortunate in being able to secure the services of a man of Dr. Ward's attainments and experience.

He was born in Troy, New York, on March 4, 1865. Receiving the A.B. degree from Williams College in 1885, he taught science in the Troy high school for three years, after which he went to Harvard for graduate study, where he received the Ph.D. degree in 1892. He then studied in Germany, at Göttingen, Freiburg and Leipzig. At Leipzig, in the laboratory of the great zoologist and parasitologist, Rudolph Leuckart, Dr. Ward received the inspiration which determined the course of his whole future career. At that time Leuckart was at the height of his power and his laboratory was the world center for training men in the field of parasitology. Dr. Ward returned to the United States determined to devote his research activities to the field of parasitology and with the vision of an American laboratory where Leuckart's method would be used in training students.

After a year as instructor in the University of Michigan he was called to the University of Nebraska in 1893, where he served until 1909, continuing his researches on animal parasites and developing the first graduate center in the United States in the field of parasitology. He increased his interest in the medical relations of his subject, becoming dean of the medical school in 1902. In 1909 Dr. Ward was called to the professorship of zoology at the University of Illinois, where he has continued his researches, at the same time training many students in parasitology. In 1914 Dr. Ward started the *Journal of Parasitology,* which, through the 18 volumes which he edited, has been the only journal in the United States devoted to this subject. At Illinois, in addition to his work as head of the department of zoology, he has taken an active part in university administration and has served on important committees. During his summers he has carried out researches for the U. S. Fish Commission, especially on the conservation of salmon, and has repeatedly made field expeditions to the Pacific Northwest and to Alaska.

Dr. Ward has also taken an active part in scientific societies. From 1895 to 1922 he was secretary of the Society of the Sigma Xi. He has been president of the American Society of Zoologists, the American Fisheries Society, the American Society of Parasitologists and the Izaak Walton League. He has received honorary degrees from the University of Cincinnati and Williams College and is a member of many scientific organizations in this country and abroad. He has been deeply interested for many years in the organization and work of the American Association for the Advancement of Science, serving as secretary of Section F in 1900, as secretary of the council in 1901, as vice-president for Section F in 1905 and as a member of the executive committee since January, 1918. His knowledge of association affairs, his wide experience and his unusual executive ability admirably fit him for the important position of permanent secretary.—*W. W. C.*

GENERAL SESSIONS OF THE ASSOCIATION

At the opening session, on Tuesday evening, Retiring President Franz Boas, of Columbia University, spoke on "The Aims of Anthropological Research," saying that anthropology attempts "to understand the steps by which man has come to be what he is, biologically, psychologically and culturally." Dr. Boas showed analytically and comprehensively how anthropologists are going about the accomplishment of that aim. His address has been published in full, in SCIENCE for December 30, 1932.

The general session on Wednesday evening was devoted to the eleventh annual Sigma Xi lecture, by Dr. Harlow Shapley, of Harvard University, on "Fact and Fancy in Cosmogony." The lecture was illustrated by means of lantern slides. It was pointed out that hitherto used theories of the origin of moon, planets, stars and the galaxy are becoming increasingly inadequate, through the rapid accumulation of highly dependable measurements and rigorous calculations of various sorts. For example, Harold Jeffries, who has been foremost in developing the Darwin hypothesis (that the moon is earth material drawn away by the tidal action of the sun) now thinks that the moon could not have been born from the earth. As to planet origins, the planetesimal hypothesis and related theories have failed to give general satisfaction. Dr. Shapley's suggestion was that we consider the possibility that moon, planets and sun may all be of the same age, having arisen in a secondary swirl or eddy of the parental spiral nebula that produced the local galaxy; thus the members of the solar system are merely survivors of that secondary swirl. As to the evolution of stars and galaxies, theories must remain very tentative indeed. Although we have much superficial knowledge of stars and reasonable explanations to suit, yet inside facts are still lacking. We have observations on more than 100,000 different galaxies, we estimate that ten times that number are within our present reach and we fancy that there are hundreds or thousands of millions; but whether our own galaxy is simple or complex we can not yet tell. There is no indication that our galaxy is of any special significance, either with regard to constitution or with regard to its position in the universe.

On Thursday evening Professor Dexter S. Kimball, of Cornell University, lectured on "The Social Effects of Mass Production." At the close of an enlightening discussion of various aspects of this subject, Dr. Kimball concluded, "If we shall achieve a semblance of economic freedom for all men, a high standard of life, security and delight in work, and leisure, it will be through much trouble and opposition, such as men have always encountered in winning political and religious freedom." The address appeared in SCIENCE for January 6.

Henceforth there is to be, at each annual meeting of the American Association, a Maiben Lecture, recently established by the council in memory of the late Hector E. Maiben, whose bequest to the association is noted on an earlier page (Membership and Financial Reports). The lecture is to deal authoritatively with some topic of great scientific interest and it is to be addressed to men and women of science in general rather than to special workers in the lecturer's own field. The first Maiben Lecture was given at Atlantic City, on Friday evening, by Dr. Henry Norris Russell, of Princeton University, who spoke on "The Constitution of the Stars." After discussing various lines of evidence, Dr. Russell concluded that atomic synthesis of heavier elements from hydrogen is probably the source of the heat and light radiated, the radiation representing the residual energy set free by the synthetic processes. The magnitude of this residue is enormous, by most human measures; the sun—which is a smallish star—radiates heat into surrounding space at the rate of 4,200,000 *tons* per second (and a *pound* of heat is sufficient to turn 30 million *tons* of rock into white-hot lava). This lecture was published in SCIENCE for January 20.

At a general session held on Tuesday afternoon at 4:30, Professor O. H. Caldwell, editor of *Electronics*, spoke on "Electrons at Work." His address dealt with the nature and operation of the electron tube and its many applications. Great industries are already built on the principle of the electron tube, those of radio apparatus and of talking pictures, for example. Electronics is now as important and adaptable in electric designing as is magnetic induction, and additional developments in this new field are rapidly emerging.

On Wednesday afternoon there were two lectures at 4:30, one by Dr. Carl C. Speidel, of the University of Virginia, and the other by Dr. Dayton C. Miller, of the Case School of Applied Science. Dr. Speidel's subject was "Nerve Growth and Repair," illustrated with 30 minutes of motion photomicrographs. Observations on growing tips of nerve fibers (in tadpole and salamander) under various sets of conditions were described, also the migration of early sheath cells (which showed interesting chemotaxes) and the whole process of formation of the myalin sheath. Nerve regeneration was discussed, with several case histories.

Dr. Miller discussed the evolution of the flute and of the musical scale, with sound illustrations produced from a number of instruments from his very extensive and comprehensive collection of flutes. This was a popular lecture, arranged in connection with the "hobbies talks" (see Exhibition, page 129).

The tenth annual Josiah Willard Gibbs Lecture, given under the joint auspices of the American Association and the American Mathematical Society, oc-

curred on Thursday afternoon at 4:30. The speaker was Professor R. C. Tolman, of the California Institute of Technology. He discussed recent extensions of the principles of classical thermodynamics, which were most completely expressed by Gibbs. Possibilities for important differences between classical and relativistic thermodynamics were illustrated by means of applications of the newer principles, and it was emphasized that "we must no longer dogmatically assert that the principles of thermodynamics necessarily imply a universe which was created at a finite time in the past and is fated for 'heat-death' in the future."

Also on Thursday afternoon was given a popular, illustrated talk on "Personal Experiences in West Indian Hurricanes," by Dr. Melville T. Cook, of the Insular Experiment Station, Puerto Rico. Dr. Cook said that these hurricanes have been known since the first voyage of Columbus. Several of them generally occur each year, in the period from July to October, but most of them expend themselves at sea. Four have struck Puerto Rico since the American occupation. They progressed at from 8 to 12 miles an hour, but the rotary movement may exceed 150 miles an hour. The path may be as much as 150 miles broad.

On Friday afternoon there were two general lectures, one by Professor Russell W. Bunting, of the University of Michigan, and the other by Professor R. W. Wood, of the Johns Hopkins University. Dr. Bunting's subject was "Recent Developments in the Study of Dental Caries." He pointed out that this is the most common human disease of civilization, but that it is not generally common or very serious among uncivilized peoples. It is caused by a bacterium of the lacto-bacillus group, which is present only in small numbers, or is absent, in the mouths of persons with little or no dental decay. Some persons are immune and immunological study may sometime make prevention possible. Diet may be important, but conclusions are not yet possible in that respect. Oral cleanliness retards the progress of the lesions, but does not appear to prevent their inception. This disease requires much more study, with the correlation of findings in various fields of science.

Dr. Wood told, in his characteristically interesting way, how he had been able to solve the problem of a remarkable rose-purple film that covers the surface of some of the thin, concave gold sequins found in the tomb of King Tut-ankh-Amen, thus gaining a knowledge of what was apparently a secret of a very few Egyptian goldsmiths of Tut-ankh-Amen's time. Spectroscopic and magnetic examination showed that the film was mainly iron and that the gold beneath it contained iron as impurity. Numerous small globules stand out in high relief on these sequins, which shows that they were heated to a high temperature after having been hammered into shape, and that the original gold contained an impurity such as arsenic, which would give rise, on heating, to the small, superficial globules or bubbles just mentioned. The outcome of Dr. Wood's study is that these sequins were probably first hammered from nuggets of native gold that happened to contain both iron and arsenic, and then heated to a red heat to bring out the colored film, or perhaps the original gold contained only iron and the ancient goldsmith introduced arsenic by melting it in considerable bulk with orpiment.

SCIENTIFIC SESSIONS

The following very brief account of the sessions of sections and societies that took part in the Atlantic City meeting have been prepared from reports furnished by the several secretaries and others, as indicated. In some instances the reports have been used with little or no alteration. In other instances these accounts are shorter than the reports. All accounts have been edited with as much care as was permitted by the very limited time that was available. To those who supplied the reports, which were indispensable, the general secretary wishes to express his hearty thanks and the appreciation of the American Association for that great service. It will be observed that the several scientific societies are arranged according to the respective association sections to which they are related. Several societies are shown as related to both Section F (Zoological Sciences) and Section G (Botanical Sciences), and the organizations of another group are shown as related to the association as a whole.

SECTION A (MATHEMATICS)

(Reports from C. N. Moore and W. D. Cairns)

On Wednesday afternoon Section A joined with the American Mathematical Society and the Mathematical Association of America to listen to two highly interesting addresses presented by Dean L. P. Eisenhart, retiring president of the American Mathematical Society, and Professor E. R. Hedrick, retiring vice-president for Section A. Dean Eisenhart's address dealt with spaces admitting complete absolute parallelism. In the theory of infinitesimal parallelism, as proposed for Riemannian spaces by Levi-Civita and generalized by Weyl to affine linear connections, parallelism of vectors at distant points depends ordinarily upon a curve joining the points. However, in certain Riemannian spaces and linearly connected manifolds of order n there are one or more fields of absolutely parallel vectors, that is, any two vectors of a field are independent of the curves joining the points of application of the vectors. But only in the case of Euclidean space of n dimensions are there n independent fields of absolutely parallel vectors.

Starting with n independent fields of vectors, it is possible to define another linear connection with respect to which the fields are absolutely parallel, and thus we have linearly connected manifolds which are not Euclidean and which admit complete absolute parallelism. These ideas center around the researches of Weitzenböck, Cartan, Vitali, Hessenberg, König, Bortolotti and Eisenhart. Vitali suggested a Riemannian metric. In 1928 Einstein developed these ideas anew as the bases for a unified field-theory of gravitation and electricity. In 1925 Eisenhart pointed out the significance of this theory in connection with simply transitive continuous groups of motion of a Riemannian manifold. All these ideas have been fully developed by Cartan and Schouten in the geometry of the group manifold of any continuous group. Robertson studied the manifolds with complete absolute parallelism, admitting a motion of the space into itself.—Professor Hedrick prefaced his address by indicating its relationship to the addresses of Pierpont and of Dresden given at Nashville and published in the *Bulletin of the American Mathematical Society,* 1928. He then proceeded to discuss the three principal schools of the logical foundations of mathematics: the logistic, the postulational and the intuitional schools. A distinction was made between the intuitional method proper and certain logical ideas advocated by that school, in particular the objections to the use of the law of the excluded middle. Attention was called to recent work in which satisfactory logical systems have been created which do not satisfy that law, and the conclusion was drawn that much of mathematics may require reconstruction.—On Tuesday morning Section A and the American Mathematical Society joined with Section K and the Econometric Society to hear an address by Dr. W. A. Shewhart on probability as a basis for action. The ensuing discussion was opened by Professor E. V. Huntington and Professor Harold Hotelling.—On Wednesday evening a joint dinner for all the mathematical organizations was held at the Hotel Morton. The tenth Josiah Willard Gibbs Lecture, under the joint auspices of the American Mathematical Society and the American Association, was delivered by Professor R. C. Tolman on Thursday afternoon. Professor Tolman's address was entitled "Thermodynamics and Relativity." He pointed out some of the highly important modifications which take place in the conclusions of classical thermodynamics when we extend it on the basis of the relativity theory. He showed that in the new theory it is not necessary for a system in heat equilibrium to have uniform temperature, since at any point the temperature would depend on the gravitational field. Also in the new theory it is possible to have reversible processes at a finite rate and a succession of irreversible processes without a final state of maximum entropy.—A trip to Princeton University occurred on Friday, to inspect the new mathematics building, Henry Burchard Fine Memorial Hall, and a symposium on "Application of the Operational Calculus to Mechanics" was held in that building. The principal address of the symposium was delivered by Professor John von Neumann. He spoke first of the theorem due to B. O. Koopman, to the effect that the partial-differential equation of the probability-density in phase-space in classical mechanics leads to operational proper-value problems of the same type as those familiar in quantum mechanics. These operators can be handled by using the extension of the classical theory of Hilbert space, due to M. Stone, J. von Neumann and others.

On Tuesday evening and Thursday morning and afternoon the American Mathematical Society held sessions for the presentation of contributed papers. At the business meeting on Thursday afternoon the following officers were elected: *Trustees,* Dean L. P. Eisenhart, Professor W. B. Fite, Dr. Robert Henderson, Professor G. W. Mullins, Dean R. G. D. Richardson; *president,* Professor A. B. Coble; *vice-president,* Professor J. W. Alexander; *associate secretary,* Professor J. R. Kline; *librarian,* Professor R. C. Archibald; *member editorial committee of the Bulletin,* Professor D. R. Curtiss; *member editorial committee of the Transactions,* Professor F. R. Sharpe; *member editorial committee of the American Journal of Mathematics,* Professor E. W. Chittenden; *member editorial committee of the Colloquium Publications,* Professor Oswald Veblen; *members of council,* Professor G. D. Birkhoff, Professor G. A. Bliss, Professor L. M. Graves, Professor Einar Hille, Professor G. Y. Rainich.

The Mathematical Association of America showed a registration of nearly 300, 177 of these being members. Sessions were held on Tuesday afternoon and Wednesday morning. Mr. E. W. Marshall (Provident Mutual Life Insurance Company) discussed the educational aspects of the relation of mathematics and life insurance, outlining the mathematical requirements for the examinations for the Actuarial Society of America and the American Institute of Actuaries, and pointing out the deficiencies of college students as revealed by these; he discussed the qualifications of prospective actuaries aside from the mathematical background and made suggestions regarding the proper courses of study in college for actuarial work. Mr. Ralph Keffer (Aetna Life Insurance Company) considered the fundamental assumptions regarding mortality and the application of the theory of probability to the development of certain problems in life insurance; he discussed these from the stand-

point of the individual purchaser of insurance, of the insurance company and of the state supervisory department, and he added a discussion of mortality investigations and of the limitations upon the interpretation of statistics. Professor J. A. Shohat (University of Pennsylvania) gave an account of the life and work of Dr. T. H. Gronwall, for the past five years until his death last May an associate in the department of physics of Columbia University. Professor Virgil Snyder (Cornell University) spoke of the successive congresses of mathematicians leading up to the international congress held at Zurich last September. Professor J. L. Walsh (Harvard University) gave a general theorem in interpolation series connected with his papers on the *Transactions of the American Mathematical Society,* 1932, and in the *Proceedings of the National Academy,* 1932.—The Chauvenet Prize, of $100, was awarded to Professor G. H. Hardy (University of Cambridge, England), for the best expository paper on a mathematical subject published in English by a member of the Mathematical Association in the triennium 1929–31. At the annual business meeting the following were elected: Professor Arnold Dresden, *president* for two years; Professors A. A. Bennett and E. B. Stouffer, *vice-presidents* for 1933; and Professors B. F. Finkel, W. L. Hart, E. V. Huntington and E. J. Moulton, *members of the Board of Trustees* for three years. The financial report showed a profit for the Mathematical Association of over $1,000, due largely to interest on endowment funds and the low cost of conducting the year's business. The Mathematical Association will meet at Chicago in the week of June 19, 1933, and at Cambridge, Massachusetts, in December, 1933, in affiliation with the A. A. A. S.

SECTION B (PHYSICS)

(*Reports from A. L. Hughes, E. Monroe Harwood, Charles F. Brooks*)

At a session on Thursday morning the retiring vice-presidential address for Section B was given by Dr. Bergen Davis (Columbia University), which was followed by two invited papers, by Dr. A. W. Hull (General Electric Company) and by Dr. T. H. Johnson (Bartol Research Foundation). Dr. Davis, speaking on "The Conquest of the Physical World," discussed the efforts of man to control his environment from the earliest times and illustrated how his progress in this effort has been accelerated remarkably within the last few generations. In the realm of pure physics, the discovery of x-rays and radioactivity and the development of the quantum theory and the relativity theory are most important. The speaker dealt entertainingly with recent studies on the atomic nucleus, a phase of physics which may soon dominate the science. Dr. Hull spoke on "Characteristics and Functions of Thyratrons," in which many widely diversified applications of the thyratron were discussed. Dr. T. H. Johnson discussed "The Cosmic-ray Hodoscope," a remarkably ingenious device for recording visually the direction of cosmic rays passing through the apparatus.

At the sessions of the American Physical Society, held on Wednesday, Thursday and Friday, about sixty papers were presented. The activity in nuclear physics and in cosmic rays was reflected in a large number of papers on these and related topics. A symposium on "Cosmic Rays" attracted an audience of over six hundred. It was opened by Dr. G. L. Locher (Bartol Research Foundation), who discussed various types of cosmic-ray tracks and their interpretation. A paper by Dr. R. A. Millikan and Dr. H. V. Neher (California Institute of Technology) presented new types of cosmic ray electroscope recently developed by them. They found that cosmic-ray intensity at sea-level is independent of latitude and considered their results to be in accord with the view that cosmic rays enter the atmosphere as photons. Dr. A. H. Compton (University of Chicago) followed with a report of experiments in which he found that cosmic-ray intensity increases from the magnetic equator to the magnetic poles, this increase being barely perceptible at sea-level but more pronounced at an altitude of 20,000 feet. He considered these results to be consistent with the view that part, if not all, of the incoming cosmic rays are fast-moving charged particles.—Officers of the American Physical Society for the ensuing year are: *President,* P. D. Foote; *vice-president,* A. H. Compton; *secretary,* W. L. Severinghaus; *treasurer,* G. B. Pegram.

At the fourteenth annual meeting of the American Meteorological Society, on December 27 and 28, Dr. H. H. Kimball (Harvard University) delivered the presidential address, on "Recent Advances in the Theory of Meteorology and its Industrial Applications." S. P. Fergusson described the equipment and work of the Mt. Washington Observatory, and also showed that the barometers used at Cambridge, at Blue Hill, in Washington and at Toronto had varied from one another by only a few thousandths of an inch over a period of more than forty years. He recommended that a national standard barometer be set up. Dr. Wm. J. Humphreys (U. S. Weather Bureau) explained how specific humidity increases during a heat thunderstorm and decreases during a line thunderstorm. E. Monroe Harwood (Harvard University) reported a study of surface temperature of the western North Atlantic, from which it appears that the Gulf Stream varies but little in position and temperature.—Reports by a number of speakers, on the meteorology of the solar eclipse of August 31, 1932, aroused lively discussion. Dr. Charles F.

Brooks (Harvard University) pointed out that weather changes during the eclipse were similar to those accompanying the normal waning of the afternoon sun, but more rapid. S. P. Fergusson (Harvard University) described open-scale instruments, especially aneroid and mercurial barographs multiplying 6 and 7 times, also a portable anemograph and a large hygrothermograph. Jerome Namias (Harvard University) showed evidence of temperature change to a height of 700 m, and a marked sinking of a cloud during the eclipse. Charles H. Pierce and Harry Wexler (Harvard University) reported inflow of air aloft and outflow at the earth's surface, on the edges of the area of totality, in accordance with pressure changes induced by cooling. Dr. Bernhard Haurwitz (University of Leipzig, Harvard University and Massachusetts Institute) showed that changes in solar radiation, air temperature, pressure and wind were nearly what should be expected from computations. Professor Willis I. Milham (Williams College) offered results of observations on eclipse temperatures at Fryeburg, Maine. Dr. Oliver J. Lee reported that no pronounced effect of the eclipse on air temperature was noted above a height of 60 feet. —Professor P. R. Gast (Harvard University) showed that with the same intensity of light, tree seedlings grew little more than half as rapidly when the light came through a water screen that cut off infra-red radiation. Dr. G. A. Loveland presented evidence to the effect that windiness should be considered in forecasting minimum temperatures. K. O. Lange (Massachusetts Institute) told of instruction and research work in meteorology carried on at the Massachusetts Institute of Technology. J. C. Jensen showed some striking photographs that established the reality of ball lightning beyond doubt.—The society's membership decreased but little last year, and its financial condition remains satisfactory. Dr. Charles F. Brooks and William R. Gregg were reelected secretary and treasurer, respectively, and the following were elected councilors for 1933–35: Edward H. Bowie, J. E. Church, Chas. A. Donnel, Joseph B. Kincer and Chas. F. Marvin. The terms of President H. H. Kimball and Vice-President H. B. Hersey continue for another year. Among resolutions adopted at Atlantic City, one favored the inclusion of more research material in the *Monthly Weather Review*. Another favored courses in meteorology and climatology in institutions of higher education.

The fourth annual meeting of the Society of Rheology was its first as an affiliated society of the A. A. A. S. The program consisted of three symposia: (1) "Flow of Solids—Rocks, Metals and Cement"; (2) "Rheological Measurement"; (3) "Rubber and Association." Twenty-two papers covering a wide range of researches were presented. The scope of rheology was indicated, for example, by papers on "Flow of Igneous Rocks," by Robert Balk, "Plastic Deformations of Metals at Elevated Temperatures under Prolonged Loading," by A. Nadai, and "Rheological Properties of Cement," by Professor Eugene C. Bingham and Markus Reiner. This society and the Chemical Foundation have been sponsoring efforts, at the U. S. Bureau of Standards, aiming to establish the viscosity of water as the international primary standard for viscosity measurements. Dr. J. R. Coe, Jr., described the instrument that has been developed for that work. He has devised a method for improving the uniformity of bore of capillary tubes. The timing of flow in the ordinary sense is eliminated by an extremely accurate machine, which forces through the capillary a given quantity of water each second. Thus the only thing left to measure is pressure. Papers by Professor E. C. Bingham and Dr. W. P. Davey and their students, relating viscosities, association and temperature coefficients of homologous series of pure organic liquids and oils, were of fundamental importance. Professor S. S. Kistler presented a mechanistic theory of colloidal behavior which seems to explain thixotropic effects and other anomalies encountered in viscous and plastic flow.

The American Association of Physics Teachers devoted two sessions to eleven contributed papers, demonstrations of new apparatus and motion pictures, and reports of standing committees. In a session devoted to invitation papers, Professor H. B. Williams recommended that premedical students be given the fundamentals that constitute a well-rounded physics course. It is desirable to convince the student, by means of specific applications of physics to medicine, that he is already beginning his study of medicine while still engaged in physics. Professor D. L. Webster spoke on "Facing Reality in the Teaching of Magnetism," pointing out that, although physics deals mainly with realities, it is often necessary in its development to employ concepts that eventually prove to be unreal; in magnetism the pole is an example. It is a question whether such concepts should continue to be taught when it is possible to avoid them. Professor A. G. Worthing described the advantages of the objective tests of the reasoning type used at the University of Pittsburgh. The multiple-choice type of test is employed. Speaking on "Training in Physics," Dr. W. F. G. Swann emphasized the importance of teaching thoroughly the relatively few fundamental laws of physics, rather than attempting to cover the whole field less comprehensively.—Forty members attended the informal dinner held at the Ambassador Hotel on Friday evening.

At the business meeting it was voted to inaugurate

a quarterly journal, *The American Physics Teacher,* which is to be published by the American Institute of Physics under editorial supervision of the American Association of Physics Teachers.

SECTION C (CHEMISTRY)

(*Report from J. H. Simons*)

Section C held four well-attended sessions jointly with the Mid-Atlantic Sections of the American Chemical Society. The retiring vice-presidential address for the section, by Dr. C. A. Browne (U. S. Department of Agriculture), was on "The Spontaneous Heating of Hay and Other Agricultural Products." Dr. Browne gave an extensive history of this subject and explained modern theories of spontaneous combustion. Twenty-eight contributed papers presented in many fields of theoretical, descriptive and applied chemistry and discussion was at times very lively. Among the papers presented was the one by Dr. Henry Eyring (Princeton University), on "Quantum Mechanics of Conjugate Double Bonds," which won the American Association Prize this year. An account of that paper is presented elsewhere in this issue of SCIENCE. Professor H. S. Taylor (Princeton University) discussed adsorption of hydrogen on oxide surfaces and differentiated between activated adsorption and adsorption of the van der Waal's type. C. E. Locoss and Professor A. W. C. Menzies (Princeton University) presented new data on the controversial topic of intensive drying as it influences certain physical properties. A paper on "Heat Capacities of Sixteen Normal Aliphatic Bromides" was given by V. Deitz, S. Goldheim and Dr. D. H. Andrews (Johns Hopkins University). Dr. M. L. Huggins (Johns Hopkins University) showed that his calculated values of interatomic and intermolecular distances were in remarkably close agreement with corresponding values obtained by experiment. Professor H. L. Johnston (Ohio State University) presented experimental results showing the amphoteric properties of silver hydroxide and the existence of AgO^- in alkaline solutions. Dr. J. Bennett Hill (Atlantic Refining Company) discussed the consumption and production of petroleum products, the trends of gasoline manufacture and the desirable properties of lubricating oils. Following Dr. Hill's paper, Dr. M. R. Fenske (Pennsylvania State College) showed how by means of fractional distillations Pennsylvania oil could be distinguished from oils made up to have the same over-all physical properties. An improvement in the physical development of photographic films and plates was described by Dr. A. F. Odell (du Pont Viscoloid Company), who showed lantern slides developed in the new way. In this process development and fixation are performed at the same time and the resulting detail is remarkably good. "The Mechanism of Birth Shock in the Newborn" was the title of a paper by Dr. I. Newton Kugelmass (Fifth Avenue Hospital, New York City), who described a method whereby the loss of weight of human babies after birth could be reduced to a minimum. This loss of weight amounts to as much as 10 per cent. in human beings but it is much less pronounced in the animals studied.

SECTION D (ASTRONOMY)

(*Report from Raymond S. Dugan*)

Section D held four sessions, from December 27 to 29, jointly with the American Astronomical Society. A group of papers headed by the address of the retiring vice-president of Section D, Dr. J. H. Moore, on "Solar Eclipse Problems," reviewed what had been learned during the few minutes of cloudless totality vouchsafed to itinerant astronomers. All agreed that the beginning of totality of the eclipse of August 31, 1932, was several seconds later than the prediction, and the discussion emphasized the necessity of agreement on what we mean by the beginning of totality.

The Lick Observatory expedition, at Fryeburg, Maine, encountered only moderate interference from clouds and secured excellent negatives of the flash spectrum on moving films. An outstanding picture of the corona was secured by the Georgetown University expedition, while the observers from Northwestern University obtained interesting data on temperature change at various heights above the ground. A film taken from a naval airplane showed the gradual darkening of the landscape as the shadow deepened.—Reports of the Leonid meteors of 1932 were given by Professor C. P. Olivier, director of the American Meteorological Society, and by P. M. Millman for the Harvard stations. On the morning of November 16, 430 meteors were observed visually at Oak Ridge, Cambridge, and ten of them were caught with cameras. The trails of two of these were interrupted by a synchronous shutter, with which the camera was equipped, and will give very accurate data concerning velocities. Five of the photographs are spectrograms, the first ones of Leonids ever secured. Dr. F. A. Melton and Dr. William Schriever showed some very convincing photographs taken from the air, of many elliptical scars in North Carolina and South Carolina, with parallel axes averaging nearly a half mile in length. These scars were attributed to the impact of a swarm of meteorites some four hundred miles in diameter.—In photometry, Dr. C. T. Elvey and J. S. Hall described their work with the photoelectric photometer, the former in measuring the intensity and outline of the *gegenschein,* the latter in observing stars in the infra-red.

A paper by Dr. Cecilia H. Payne showed the importance and difficulty of standardizing photographic photometry. In spectroscopy, Dr. V. M. Slipher presented further studies on the light from the sky itself; it is now possible to distinguish between scattered light from the stars, auroral light and what the author calls "cosmical radiation." Among the papers from Mt. Wilson was one by Adams and Dunham, describing their failure to find any evidence of oxygen on Mars, thereby setting a lower limit for the oxygen content of the atmosphere of that planet.—About eighty persons attended and for the most part stood faithfully by throughout the sessions. A lecture by Dr. Harlow Shapley on "Fact and Fancy in Cosmogony" was given at one of the association's general sessions, and Dr. Henry Norris Russell gave the Hector Maiben Lecture at another general session, on "The Constitution of the Stars."

SECTION E (GEOLOGY AND GEOGRAPHY)

(Report from Kirtley F. Mather)

Section E held one session on Tuesday, in conjunction with the Geological Society of America. None of the other associated organizations related to this section were in session in Atlantic City, and the principal meeting of the Geological Society was held in Cambridge, Massachusetts, from December 28 to 30, but about thirty-five geologists and geographers attended the joint session in Atlantic City and ten papers were presented on the program. Professor W. H. Hobbs (University of Michigan), vice-president for Section E, presided. The address of the retiring vice-president, Professor Douglas Johnson (Columbia University) was entitled "The Rôle of Analysis in Scientific Investigation." Abstracts of all papers presented are to be published in the March issue of the *Bulletin of the Geological Society of America.*—Several geologists participated in a symposium on "Pleistocene and Recent Changes of Level along the North Atlantic Coast." Professor Thomas C. Brown (Fitchburg, Massachusetts) presented data indicating that the southward inclination of glacial lake terraces in central Massachusetts is less than two feet per mile and therefore does not correspond with the usual interpretation of the shore features along the coast of Massachusetts, New Hampshire and Maine. Mr. H. A. Marmer (U. S. Coast and Geodetic Survey) described the methods used by that organization in determining mean sea-level and emphasized the necessity for long-continued observations in order to exclude the large fluctuations due to atmospheric conditions. Professor William F. Cheney, Jr. (Connecticut Agricultural College) reported on statistical investigations of sea-level determinations which indicate that the Atlantic coast is rising in the vicinity of Portland, Maine, at a rate of approximately half a foot per century, is sinking at a rate of a few inches per century in the area between Boston and the southern tip of New Jersey, and is rising in the vicinity of Charleston, South Carolina, at a rate of slightly more than a foot per century.

SECTION F (ZOOLOGICAL SCIENCES)

(Reports from Geo. T. Hargitt, William H. Cole, H. B. Hungerford, A. I. Bourne, Horace W. Stunkard)

Section F met jointly with the American Society of Zoologists on Wednesday, Thursday and Friday. On Thursday afternoon Section F adopted a resolution recognizing the great prospective value of a proposed compendium of methods for rearing and maintaining invertebrates, and endorsing a cooperative effort among zoologists toward the making of such a compendium. A committee, consisting of Professor J. G. Needham (Cornell University), Dr. F. E. Lutz (American Museum of Natural History, New York City) and Professor Paul S. Welch (University of Michigan), was named to consider ways and means and to further this project. The committee was authorized to add to its personnel.

On Thursday evening a dinner for all zoologists was attended by a hundred and fifty persons, following which was delivered the address of the vice-president for Section F, Dr. Charles Zeleny (University of Illinois), who spoke on "Genetics and Embryology." The address of Dr. Zeleny is to appear in SCIENCE.—This was the thirtieth annual meeting of the American Society of Zoologists, held from December 28 to 30, inclusive, with the largest attendance for several years. The program consisted of 213 papers, of which 76 were to be read, 17 were to be demonstrated and 120 were to be read by title. On Wednesday morning two simultaneous sessions were held, one in physiology and the other in embryology, with attendance of 70 and 100, respectively. Wednesday afternoon was devoted to the 17 demonstrations, including Dr. Robert Chambers' motion pictures of the developing sea-urchin egg. Due to the smallness of the room, this part of the program was not wholly satisfactory to all. At 4:30 on Wednesday, at a general session of the A. A. A. S., Dr. Carl C. Speidel gave an address on growing nerves, illustrated by motion pictures. The annual Biologists' Smoker was held on Wednesday evening, at the Ambassador Hotel, with about 500 in attendance.—Sessions for Physiology and Cytology were held on Thursday morning, with attendance of 130 and 100, respectively. At the afternoon business meeting a new constitution was adopted, 44 new members were elected and the following new officers: *President,* Charles Zeleny; *vice-*

president, J. H. Bodine. A special committee is to consider during the coming year the important questions of future policy of the society and changes in its organization. A resolution urging the appointment of a "person of proved scientific and practical acquaintance with the fisheries, regardless of the political party in power" was adopted. Following the business meeting sessions in physiology and miscellaneous subjects were held, with 150 and 30 in attendance.—On Friday morning the largest and most active session held by the society in recent years was devoted to a symposium on "Embryonic Determination," with invited papers by Dr. E. G. Conklin, Dr. R. G. Harrison, Dr. D. H. Tennent and P. Weiss. Over 200 persons attended and each paper was followed by a lively discussion. In the afternoon the Zoologists joined with the Naturalists, who had arranged a symposium on "Heredity and Evolution in Relation to Man."

The Entomological Society of America held its twenty-seventh annual meeting on Wednesday and Thursday. Thirty-four papers, dealing with research work in many phases of entomological study, were presented, some dealing with quite new fields of investigation. The annual address was given by Dr. J. M. Swaine, Dominion Entomologist (Ottawa, Canada), on "The Influence of Insect Life on Forest Development." An afternoon was devoted to a symposium on the influence of civilization on the insect fauna of North America. Forest regions, industrial regions, cultivated areas and purposeful introductions were considered by Dr. S. A. Graham (University of Michigan), Professor P. W. Claassen (Cornell University), Dr. R. C. Smith (Kansas State College) and H. S. Smith (University of California), respectively. Activities of civilized man were shown to have had a mighty influence on the insect population, increasing some species to destructive outbreaks in forests and fields and reducing others to a marked degree. In each case other living things, both plant and animal, were shown to have been very greatly influenced. Analysis of results following the introduction of parasites to reduce destructive insects emphasized the importance of anticipating probable consequences when any new insect factor is to be added to an environment.—Among papers of the general program that attracted special interest were a demonstration of radioactive lead arsenate in insect tissues, by Dr. David E. Fink (Takoma Park, Maryland), and an illustrated discussion of ultra-violet patterns in butterflies, by Dr. Frank E. Lutz and Richard Burlingame (American Museum of Natural History, New York City). It appears that the appearance of butterflies to one another is very different from their appearance to man.—This meeting of the Entomological Society was presided over by President J. J. Davis. Officers elected for 1933 are: *President,* R. E. Snodgrass; *first vice-president,* W. B. Herms; *second vice-president,* C. H. Richardson; *secretary-treasurer,* H. B. Hungerford.

The American Association of Economic Entomologists and its sections convened in the Viking and Tower rooms of the Haddon Hall Hotel, where the accommodations were excellent. The attendance was approximately 175. The Section on Plant Quarantine opened its program on Wednesday morning and continued throughout the day, the Section on Apiculture met on Thursday afternoon and the Extension Entomologists held their session on Friday morning. General sessions were held on Thursday and Friday. Many papers of timely interest were presented and a series of invitation papers were devoted to the present status of the codling moth problem. This association was shown to be in a healthy financial condition; 50 new members were added and approximately the same number were advanced from associateship to active membership. Officers elected were: *President,* Dr. W. E. Hinds (Baton Rouge, Louisiana); *secretary,* A. I. Bourne (Amherst, Massachusetts).

The American Society of Parasitologists held its eighth annual meeting on Wednesday, Thursday and Friday, under the presidency of Dr. Maurice C. Hall (U. S. Bureau of Animal Industry). The program contained 76 titles, contributed by 88 members, and 49 of the titles announced were presented either orally or by demonstration. Four sessions were devoted to the reading of contributions, arranged according to subject-matter. Seventeen papers dealt with susceptibility and resistance to parasitic infestations and others dealt with the morphology, cytology, physiology, development, life history, bionomics and control of various groups of protozoan, helminth and insect parasites. In the address of President Hall, entitled "Is Parasitology a Science?", an incisive analysis of the domain and methods of science was presented, showing the place of parasitology in the biological field; the speaker urged the increasing application of scientific methods to economic and social problems. The presidential address was followed by a demonstration session, at which refreshments were served. The demonstration program permits the presentation of many researches simultaneously, facilitates informal discussion between investigators and introduces a valuable personal and social feature. The annual dinner of this society was held on Wednesday evening, followed by a business session. In the year just closing the society had become incorporated and the *Journal of Parasitology* had been generously transferred to it by Professor Henry B. Ward, now permanent secretary of the American Association. This

fine gift was appropriately acknowledged, and Dr. W. W. Cort, chairman of the editorial committee, reported for the committee and the editorial board. A vote of appreciation was given to the retiring secretary-treasurer, Dr. Norman R. Stoll. The following officers were elected for 1933: *President,* William H Taliaferro; *vice-president,* F. C. Bishopp; *secretary,* H. W. Stunkard; *treasurer,* Justin Andrews; *council members for four years,* N. R. Stoll and H. E. Meleney.

SECTION G (BOTANICAL SCIENCES)

(Reports from S. F. Trelease, G. S. Avery, J. M. Arthur, N. M. Grier, W. A. Whitney, Harry M. Fitzpatrick)

Section G met on Tuesday afternoon, in joint session with associated societies. Dr. E. D. Merrill delivered the retiring vice-presidential address for Section G, his subject being the interrelations between crops and civilizations. This address was followed by a memorial program celebrating the centenary of Julius von Sachs (1832–1897). Following introductory remarks by Dr. A. F. Blakeslee (presiding in the absence of Dr. H. L. Shantz), a paper by Dr. D. H. Campbell, on the Sachs text-book and its influence on botany in America, was read by Dr. G. J. Peirce. Dr. R. H. True spoke on "Sachs, the Man and the Teacher." Dr. C. E. Allen characterized Sachs as the last of the botanical epitomists. All these addresses are to be published in an early issue of the *Bulletin of the Torrey Botanical Club.*

The Botanical Society of America held a very successful meeting from Wednesday to Friday, with a membership attendance of over 200. The three sessions of the general section included a wide range of topics. Dr. G. H. Smith discussed the differentiation of mesophyll in deciduous trees. LaDema M. Langdon described fertilization, endosperm formation and stages of embryogeny for *Carya* and *Juglans,* as did Dr. E. Artschwager and Ruth C. Starrett for *Beta vulgaris,* emphasizing the time factor. Professor G. S. Avery, Jr., described marked increase in size of the upper leaves due to increase in size of all fundamental tissue cells caused by the "topping" of tobacco. Katherine Esau found that curly-top induces phloem degeneration in *Beta vulgaris.* Dr. E. B. Matzke emphasized the radial and bilateral symmetry of ten-, five- and three-stemmed flowers of *Stellaria media* and the importance of unfavorable nutrient conditions in causing androecial reduction. Professor D. S. Johnson reported on symmetry and curvatures of the sporocarp in *Marsilea* and *Pilularia.* Sister Mary O'Hanlon reported on a symbiotic fungus in the thalli of eight species of *Marchantia.* Dr. M. T. Cook discussed morphogenetic responses of certain dicotyledonous roots to invasion by nematodes. That certain Myxophyceae may tolerate temperatures as high as 852° C. was reported by J. J. Copeland, and thermal tolerance was suggested as a primitive character. Dr. B. M. Duggar and A. Hollaender found that the virus of tobacco mosaic was more resistant than certain bacteria and bacterial spores to monochromatic ultra-violet radiation. R. P. Wodehouse presented an "oil drop" theory of pollen-grain pattern formation. G. S. Torrey described his use of stereomicrophotography in botanical teaching. Wanda K. Farr demonstrated divisions of the epidermal layer of the cotton ovule after flowering, and suggested that daughter cells of such divisions may take part in the formation of fibers. The appearance, during stratification, of a fungus in the seed coats of *Symphoricarpos racemosus* and the time of differentiation of the floral axis in *Gladiolus* were described by Dr. Norma E. Pfeiffer. G. L. Church and Dr. E. C. Jeffrey noted the universal presence of polyploidy and sterility in several varieties of onions. They also reported chiasmatypy in a large number of somatic cells in plants, similar to that of the meiotic divisions. In meiosis in pollen-mother cells of *Digitalis ferruginea,* Sarah F. Wentzel showed the minute chromosomes retaining their individuality throughout the maturation divisions. Dr. I. J. Condit found that the diploid number of 26 chromosomes is constant in 31 additional species of *Ficus* of New or Old World origin. Development of the megagametophyte, endosperm formation and embryogeny in *Eragrostis major* were described by Dr. E. L. Stover. Dr. F. A. Varrelman described transitions between true stamens and carpels of stamen origin in *Malus spectabilis*— Twenty-eight papers were presented during three very interesting sessions of the Physiological Section of the Botanical Society and many of them provoked animated discussion. Dr. J. N. Spaeth, Alice M. Andersen and Florence Flemion presented five papers on seed germination. W. H. Tharp told of the production of more permeable seed-coats of barley by growing the plants in moist cages. Dr. W. E. Loomis discussed the daily growth of maize in relation to light and water supply. Professor O. L. Inman and Paul Rothemund described the decomposition products of chlorophyll isolated from the stomach contents of cows and sheep. Wanda K. Farr discussed the production of abnormal cotton fibers in relation to pressure variations within the boll. Dr. D. I. Macht told of the toxicity of diseased blood serum for the growth of lupine seedlings. L. P. Miller found that many compounds effective in forcing potato tubers increased respiration, without relation to increase in sugar content. O. W. Richards stated that considerable study of yeast cell division failed to reveal mitotic division.

Dr. A. W. Barton discussed the acidity of corn juices. Dr. J. S. Cooley and J. H. Crenshaw reported that wound dressings on apple trees, not usually toxic in the spring and summer, produced killing of tissue in the fall and winter. N. C. Thornton, describing effect of CO_2 on fruits and vegetables in storage, reported that high concentrations cause increased respiration in some tissues and decreased respiration in others; CO_2 was found to produce increased alkalinity of tissues. Evidence was presented by J. J. Copeland that certain strains of blue-green algae fix molecular nitrogen. Professor A. J. Heinicke discussed the influence of CO_2 supply, light, spraying and ringing upon photosynthesis in attached apple leaves. Dr. A. E. Hitchcock, Dr. William Crocker, Dr. P. W. Zimmerman, Professor C. G. Deuber and R. H. Wallace presented five papers on the toxic and anesthetic effects of various gases. The first three speakers showed slides and motion pictures illustrating the effects of carbon monoxide in stimulating the production of roots on stems and in anesthetizing plants. R. H. Wallace stated that neither ether nor chloroform would stop photosynthesis, except in lethal concentrations. Dr. F. E. Denny and Dr. J. M. Arthur presented the two concluding papers. Officers of the Physiological Section for 1933 were elected as follows: *Chairman,* L. Knudson; *vice-chairman,* J. M. Arthur; *secretary-treasurer,* E. F. Hopkins; *representative, National Research Council,* E. N. Transeau (alternate, F. E. Denny).—The session of the Systematic Section of the Botanical Society was devoted to a symposium on objectives and methods in field work. Dr. E. D. Merrill emphasized the importance of compiling for this purpose data in fields other than botany, such as information pertaining to economic uses and local names. K. A. Ryerson discussed the objectives of the plant exploration work of the U S. Department of Agriculture. Dr. E. T. Wherry elaborated the case of the box huckleberry as an illustration of the need of field work. Dr. F. W. Pennell showed the necessity of revising by field study all the herbarium concepts inherited from the past. A paper by Professor O. E. Jennings on cryptogams and field work concluded the symposium. On Thursday, following an illustrated lecture by Professor M. A. Chrysler, on the vegetation of the New Jersey pine barrens, a party of 22 spent most of the day on a field trip to those barrens and neighboring coastal marshes. Friday morning's session was mostly devoted to papers on the agrostology of Yucatan, and of Eastern Asia compared with Eastern North America, by J. R. Swallen and Y. L. Keng, respectively. Professor A. S. Hitchcock commented upon recent progress in American agrostology. Note was taken of a botanical map of Quebec by Fr. Marie-Victorin. Dr. C. R. Ball criticized certain trends in systematic botany. Alfred Rehder was elected *chairman* and C. A. Weatherby *secretary* of the Systematic Section.

The annual dinner for all botanists was held on Thursday evening, with an attendance of 230. President G. J. Peirce presided, and the retiring president, Dr. C. J. Chamberlain, delivered his address on the phylogeny and geographic distribution of the cycads. The address, illustrated with colored slides, included a witty and interesting account of field studies extending through many years. Announcement was made of the election of the following officers of the Botanical Society for 1933: *President,* E. J. Kraus; *vice-president,* G. E. Nichols; *secretary,* L. C. Petry; *treasurer,* H. A. Gleason; *member, editorial board, American Journal of Botany,* C. E. Allen.

The twenty-fourth annual meeting of the American Phytopathological Society was held from December 28 to 30. Nearly two hundred members were present and 112 papers were presented in eleven sessions. There were joint sessions with Section G, A. A. A. S. (the Julius von Sachs Memorial Program), and with the newly formed Mycological Society of America. The following officers were elected: J. C. Arthur, *president;* N. E. Stevens, *vice-president;* Carl Hartley, *councilor.* F. C. Meier, *secretary-treasurer,* and H. B. Humphrey, *editor-in-chief of Phytopathology,* continue. Forty-seven new members were elected, bringing the total membership now to 827.—The contributions presented at this meeting may be classified according to subject as follows: Diseases of miscellaneous crops (2 sessions), 15 papers; virus diseases of tobacco, 10 papers; soil treatment, seed treatments and sprays, 12 papers; diseases of forest trees, 9 papers; virus diseases, 11 papers; diseases of ornamentals, 11 papers; diseases of cereal crops (2 sessions), 20 papers; diseases of deciduous and small fruits, 13 papers; vegetable diseases, 11 papers. At the annual conference on extension work in plant pathology (held on December 28 under the chairmanship of R. J. Haskell) about 50 specialists took part in discussions of the following topics: use of lantern slides, film strips, motion pictures, photographic enlargements, colored plates and specimens with demonstrations and exhibits; use of radio (with demonstration), plant-disease schools and study classes, plant clinics, farm-and-home week programs, contests and clubs, agricultural trains and plant-disease surveys as a method of teaching.—A session on "The Outlook for Plant Pathology under Present Conditions," under the chairmanship of Professor H. H. Whetzel, considered changes in extension methods to meet changed economic conditions, the effect of present economic conditions on the prevalence of some plant

diseases.—On December 28 was held the annual dinner, entertainment being furnished under the auspices of the pathologists of New Jersey, New York, Delaware, Pennsylvania and Harvard University.—Ten new or little known plant diseases were reported at this meeting: crown gall on *Carnegiea gigantea* (by Dr. Michael Levine); a sterile, but fungus-like, leaf spot on pineapple (by Dr. Melville T. Cook); a new sclerotial fungus from Texas (by D. C. Neal and R. W. Wester); a brooming of *Robinia pseudoacacia* (by Dr. Carl Hartley and L. W. R. Jackson); a *Nectria* canker of basswood (by D. S. Welch); *Nectria coccinea* on beech (by John Ehrlich); fig mosaic in California (by Dr. Ira J. Condit and Professor Wm. T. Horne); a new necrogenic virus disease of potatoes in California (by E. S. Schultz and W. P. Raleigh); a *Cytospora* canker of *Picea* (by C. J. Gilgut and Dr. O. C. Boyd). Other scientific contributions included descriptions of the perfect stages of *Sclerotium gladioli* (by Dr. F. L. Drayton) and of *S. oryzae* (by E. C. Tullis); the production of a fertile saltant of *Helminthosporium sativum* by ultra-violet irradiation (by Dr. F. J. Greaney and Dr. J. E. Machacek); acquired immunity to mosaic and spot necrosis in tobacco (by J. M. Birkeland); the toxicity of mercuric chloride-potassium iodide solutions (by W. P. Raleigh); the genetics of *Sphacelotheca sorghi* and *S. cruenta* (by Dr. H. A. Rodenhiser); the pathology of crosses between the loose and covered barley-smut fungi (by Dr. H. A. Rodenhiser and B. F. Barnes); the occurrence of apple scab on stored fruit (by C. O. Bratley); the virus diseases of dahlia (by Philip Brierley); *Sphaceloma* on sweet violets (by Professor L. M. Massey, Dr. R. P. White and Dr. A. E. Jenkins); a new fruit spot associated with apple measles (by Anthony Berg); bacterial cankers of *Prunus* in California (by E. E. Wilson); a tuber rot of potatoes caused by *Botrytis cinerea* (by Dr. Donald Folsom); and a bacterial blight of broad beans in Louisiana (by L. H. Person). Abstracts of the papers on the program of this meeting are printed in the January number of *Phytopathology*.

The ninth annual meetng of the American Society of Plant Physiologists, under the presidency of Professor D. R. Hoagland, was alternated with the sessions of the Physiological Section of the Botanical Society of America. Twenty-five papers were presented in the regular sessions of the society and 24 papers in joint sessions with Section G, the American Society for Horticultural Science and the Ecological Society of America. At the Plant Physiologists' dinner on Friday evening President Hoagland spoke on "Plant Physiology Problems," and Dr. W. W. Garner delivered the Stephen Hales address on "Response of Long-day and Short-day Plants to Relative Length of Day and Night." Professor Charles F. Hottes was elected Charles Reid Barnes life member of the society, and Dr. H. B. Vickery was awarded the Stephen Hales prize for outstanding contributions to the science of plant physiology, for his work on plant proteins. At the first session Professor J. N. Martin reported that most of the root reserves in sweet clover are stored in September after top growth is completed. K. H. Burnett and Dr. W. E. Loomis found that translocation from corn leaves was much more rapid in the afternoon than at night. J. D. Hartman emphasized the inverse relationship of turgor pressure and rate of cell wall hardening in determining the form of potato sprouts. Dr. F. M. Andrews reported on a technique for studying the viability of pollen. M. W. Parker found that the water soluble polysaccharides that form an important portion of sweet corn kernels resemble beta amylose. Dr. F. J. Veihmeyer and Dr. A. H. Hendrickson presented the results of extensive experiments showing that the wilting coefficient is a constant property of the soil and is not significantly affected by the species or condition of the plants used for its determination. At the Friday morning session Professor D. R. Hoagland and T. C. Broyer showed that accumulation of diffusible ions within a plant tissue is dependent upon the carbohydrate and oxygen supply of the tissue and has the temperature coefficient of a chemical reaction. Evidence that a quantum of blue light is as efficient in photosynthesis as a quantum of red light was presented by G. R. Burns. E. S. Johnston reported that normal tomato plants could be grown in light from which the infra-red waves had been removed. A close correlation between growth in corn and the total chlorophyll content of the plant was found by Professor H. B. Sprague and Normal Curtis. Dorothy A. Francis reported injury to plants by x-rays, but Professor C. A. Shull found that by the use of suitable filters and short exposures it was possible to obtain a stimulating effect. A passive rôle in water absorption was assigned to the roots of plants by Dr. P. J. Kramer. The thermal conductivity of oats increases with the moisture content, but is always very low, according to Dr. A. L. Bakke and Professor Harold Stiles.—At the joint session with the American Society for Horticultral Science, H. B. Tukey reported that when the abortive embryos of early varieties of cherries are transferred to a suitable nutrient medium they develop into normal seedlings without going through a rest period. High winter temperatures were found by Dr. Lee M. Hutchins to be the cause of prolonged dormancy in southern peach trees. Dr. W. E. Loomis pointed out that factors that change the course of plant development also alter the balance between growth and differentia-

tion. Dr. Walter Thomas showed that the ratios between nutrients applied, nutrients recovered and effect on growth of apple might vary widely and pointed out the relation of his results to the philosophy of Holism. Dr. W. R. Robbins reported that sweet potatoes grown with deficient K showed less cambial activity and had a high length-diameter ratio. Results indicating that temperature factors are dominant over photoperiodism in the seeding of celery, cabbage and beets were reported by Professor H. C. Thompson. Dr. F. S. Brackett described the apparatus used at the Smithsonian Institution for studying photosynthesis and showed preliminary results on light and CO_2 studies which closely followed Blackman's law of limiting factors.

The newly organized Mycological Society of America held its first meeting, on December 28, 29 and 30, with Dr. Wm. H. Weston, Jr., presiding. A constitution was adopted and arrangements were made with the New York Botanical Garden for the publication of *Mycologia,* the official organ of the new society. The officers elected are: *President,* C. L. Shear; *vice-president,* C. W. Martin; *councilors,* H. S. Jackson and C. R. Orton; *secretary-treasurer,* H. M. Fitzpatrick; *editors,* G. R. Bisby, H. M. Fitzpatrick, E. B. Mains, F. J. Seaver, J. A. Stevenson and F. A. Wolf. The editor-in-chief for 1933 is F. J. Seaver. The naming of a historian was authorized. The vice-president is empowered to arrange for a summer meeting, which is expected to be primarily a fungus-foray.—On Wednesday afternoon the Mycological Society met in joint session with Section G, and on Thursday morning with the American Phytopathological Society. The Thursday afternoon session was devoted to the presentation of papers chiefly on the various aspects of sexuality in fungi. The papers on Friday morning were mainly on the Phycomycetes, while Friday afternoon's program was of a more miscellaneous character. Forty papers were given. A motion picture illustrating the life cycle of the Myxomycetes was shown by Dr. F. L. Howard, and Professor A. H. R. Buller and Dr. J. H. Craigie (University of Manitoba) showed photomicrographs of hand sections through living pycnia of Puccinia, showing fusion of pycniospores with trichogynous hyphae.

PROGRAMS RELATED TO BOTH SECTION F AND SECTION G

(Reports from J. W. Gowen and E. W. Lindstrom, Raymond Kienholz, W. P. Whiting, James E. Ackert, A. I. Ortenburger)

The Biologists' Smoker, sponsored by the American Society of Naturalists in conjunction with the American Society of Zoologists, the Botanical Society and the Genetics Society, was held on Wednesday evening at the Hotel Ambassador, where a group of four hundred or more seemed to find the Pompeiian Grill Room a congenial place to renew acquaintances and talk over biological problems. The annual symposium of the American Society of Naturalists, on "Heredity and Environment in Man," was held on Friday afternoon with an attendance of approximately 250. Dr. H. H. Newman presented his critical evidence on the resemblances and differences of ten pairs of identical twins reared apart, in contrast with twins reared together. Body weight, general health and strength, condition of the teeth, mental and temperamental ratings were about twice as uniform in twins reared apart as in fraternal twins brought up together. From these facts it is concluded that, under such circumstances, the hereditary constitution received by each twin of the pair had about twice the effect of the differences in the environment in determining these characteristics. Dr. Barbara S. Burks presented a résumé of evidence for the relative effects of heredity and environment taken from studies on children in orphanages and elsewhere. As with the ancient Greeks, the modern evidence showed that human abilities cluster in family groups; that absence from school may depress tests for mental ability, but that ordinary environmental differences do not alter it; that differences between rural and urban intellects are to be attributed to the drainage of the mentally able from one locality to another, and finally that the home environment is closely related to the intellect of the family. Dr. A. Weinstein delivered a brilliant and searching analysis of facts and foibles in our present handling of human genetic problems. A fourth paper, by Dr. L. Hogben, on "Some Methodological Aspects of Human Genetics," was read only by title, but it will be published in the symposium series.—The following named officers of the American Society of Naturalists for 1933 were elected: B. E. Livingston, *president;* E. V. Cowdry, *vice-president;* M. Demerec, *treasurer;* E. W. Lindstrom, *secretary.* Dr. A. Banta was appointed chairman of a special committee to cooperate with the vice-president in arranging a special semi-centennial program for the next annual meeting. Thirty-seven new members were elected.—The annual Naturalists' Dinner was held on Friday evening, with President R. A. Gortner presiding. Dr. Gortner's presidential address "Others," which will be printed in SCIENCE shortly, was a forceful and penetrating analysis of relations between man and his natural resources; particularly with respect to his mineral resources, man is wastefully throwing away his heritage.

The Ecological Society of America, under the presidency of Dr. George E. Nichols, held sessions

on Wednesday, Thursday and Friday. On Wednesday morning the ecological diagnosis of types of corn, the relation between yield of corn and environmental factors, the effect of vegetative cover on soil erosion and the vegetation of the Sonoran Desert were considered. The Wednesday afternoon session was devoted to papers on hydrobiology and aquiculture, with special reference to coastal waters. Among the topics presented was the interesting rôle of copper in the setting and distribution of the oyster; in brackish water a colloidal precipitate of copper oxychloride after ingestion initiates the attachment of the oyster larva after an average latent period of four minutes and twenty seconds. A brief account of the plans of the new hybrobiological laboratory of the State of Maryland, at Solomon's Island, in the lower Chesapeake Bay, was of general interest. Supplemental to this program was a field trip on Saturday to the oyster beds of Delaware Bay.—The ecologists' dinner was held on Wednesday evening, followed by the illustrated address of President G. E. Nichols, on "Photographic Records of Changes in Vegetation." Those attending the joint session with the American Society of Zoologists listened to a discussion of the distribution of amphibians and reptiles in the faunal areas of southern Arizona. It was shown that great variations in the vigor and fecundity of chinch bugs from year to year may be as responsible as are climatic fluctuations for their variation in numbers. A method of marking living snakes and unique data obtained thereby regarding their wanderings were presented. In the joint session with the Botanical Society of America papers on the following topics were given: effect of soil salinity on vegetation, invasion of grass range by shrubs when overgrazed, a new black porous-porcelain sphere for estimating drying influence of sunshine, spherical *versus* horizontal plane surfaces for measuring radio-atmometric effects, the edge of the forest in Alaska and reasons for its position as suggested by pollen analysis of near-by bogs, and epharmony in a New Zealand *Rubus*. The last mentioned paper has been sent by Dr. Leonard Cockayne, of New Zealand. The Ecological Society voted that a letter of greetings and appreciation be sent to Dr. Cockayne. A symposium on "Some Aspects of Forest Succession" included discussions by Dr. W. S. Cooper, Professor L. G. Romell, Dr. H. L. Shirley, Professor H. J. Lutz and P. B. Sears. A joint session with the American Society of Plant Physiologists and the Society of American Foresters was devoted to forest physiology and ecology. Among the subjects discussed were: the physiological activity of evergreens and green twigs in winter, the complementary effects of radiation and nitrogen intensities on growth of pine seedlings, relation of soil temperature to root development of pine seedlings, the reaction of chestnut bark to the blight disease, the distribution of Scotch broom in Virginia. An interesting field trip to the New Jersey pine barrens and plains was taken on Saturday.—The following are the officers for 1933: E. B. Powers, *president;* H. C. Hanson, *vice-president;* Raymond Kienholz, *secretary-treasurer.* C. F. Korstian was appointed associate editor of *Ecological Monographs.*

The Genetics Society of America, formed from the Joint Genetics Sections of the American Society of Zoologists and the Botanical Society of America (which have presented programs at recent annual meetings of the A. A. A. S.), held its first meeting at Atlantic City. Twenty-one papers were presented at the regular sessions, while an equal number were read by title and five were given by demonstration. A symposium on "The Progeny Test as a Means of Evaluating the Breeding Potentialities of the Individual" consisted of papers by Dr. H. D. Goodale and Dr. L. E. Kirk, which stimulated considerable discussion. One of the regular sessions was mainly devoted to chromosome analysis, including cytological studies by Dr. Edwin R. Helwig and H. Irene Corey, with genetic phases presented by Dr. Alexander Weinstein and Professor E. W. Lindstrom. A session devoted largely to the gene included papers on genic variability, multiple allelomorphs and the action of genes in development. A noteworthy contribution at this session was that of Dr. John W. Gowen and Elizabeth H. Gay, on "Gene Number, Kind and Size in Drosophila." By consideration of quanta of x-radiation absorbed in spermatozoa, mutations produced and size of chromosomes, it was concluded that the gene has a minimum of 14,380 loci and a size of fifteen protein molecules. Genic control of developmental processes was discussed by G. A. Lebedeff (*Drosophila virilis*), Dr. L. C. Dunn and D. R. Charles (mice), and Professor E. W. Sinnott (Cucurbita and Capsicum). Heredity in clones interrupted by sexual reproduction was discussed by Dr. T. M. Sonneborn, who has applied Mendelian methods to Protozoa, and by Dr. A. M. Banta and Thelma R. Wood, who found that recessive mutations accumulate in Cladocera after long-continued parthenogenesis. Dr. A. M. Banta's studies were presented also by demonstration. Cysticercus disease in rats and genetic factors in relation to malignant tumors were presented by demonstration and reading by Dr. M. R. Curtis, W. F. Dunning and Dr. F. D. Bullock. Sex-linkage and polymorphism in Mexican fishes were demonstrated by Dr. Myron Gordon.

The American Microscopical Society held its fifty-first annual meeting on Thursday. The following

officers were elected for 1933: *President,* M. J. Elrod; *first vice-president,* R. J. Pool; *second vice-president,* J. J. Myers; *member of executive committee* (3 years), L. E. Noland. J. E. Ackert continues as secretary. The custodian, Dr. Henry B. Ward, reported that the Spencer-Tolles Fund is in excess of $16,500. Professors M. J. Elrod and J. E. Ackert were named to represent this society in the council of the American Association.

In the scientific program of the Phi Sigma Biological Research Society zoological papers predominated —several of them dealing with morphogenesis. A report on bat migration attracted considerable interest, as did the report of a European hydromedusa on the Maine coast. Three motion pictures were shown, one illustrating the possibilities of this medium for demonstrating plant zonation and successional relations. As usual, most of the contributions were from junior science students, who largely comprise the active membership of this society.

SECTION H (ANTHROPOLOGY)

(Reports from Carl E. Guthe and Dudley J. Morton)

The American Anthropological Association, the American Folk-Lore Society and Section H presented a combined program on Wednesday, Thursday and Friday, and the American Association of Physical Anthropologists held meetings on Thursday and Friday. The opening general session of the A. A. A. S., Tuesday evening, was of particular interest to all workers in anthropology. At that session Professor Franz Boas, of Columbia University, retiring president of the American Association, spoke on "The Aims of Anthropological Research." The combined program mentioned above listed twenty-nine fifteen-minute communications, which dealt with various aspects of the comparative study of human cultures. Some of them reported upon results of research among specific cultures in Africa, the Near East, Australia and Oceania. Others were concerned with more general problems, such as motor habits, music patterns, prehistoric disease and culture parallels. However, as might be expected, the majority of the papers dealt with studies of North American Indian cultures. Seven papers discussed ethnological work among cultures found along the Atlantic Coast, on the Great Plains, in the Southwest, in California and on the Northwest Coast. On Wednesday morning seven papers presented reports upon recent archeological developments in Mexico, the Southwest, Texas, the Great Plains and the southern Mississippi Valley, and discussions centered around the relationships between Mexican and Southern United States cultures. Later in the week a series of papers described recent archeological work in Persia and Europe, including recent work in Jugoslavia, conducted by the American School of Prehistoric Research and associated organizations.—Following two papers on ballads and folk-lore, the major part of the Thursday morning session was devoted to a symposium attended by about sixty persons, on "Field Methods in Ethnology." The general approach to the problem was first discussed, and then the functional approach and the folk-lore approach were outlined.—The annual Anthropologists' dinner, held under the auspices of all four organizations, was served to sixty persons on Thursday evening. It was followed by Dr. William King Gregory's illustrated retiring vice-presidential address for Section H, on "The New Anthropogeny: Twenty-five Stages in Vertebrate Evolution from Silurian Chordate to Man." This address has been published in SCIENCE for January 13.—On Friday morning Section H held a joint session with the American Association of Physical Anthropologists, and on Saturday morning it joined with Section L, in a symposium on primitive linguistics.—The fourth annual meeting of the American Association of Physical Anthropologists was held under the presidency of Dr. A. H. Schultz. The program contained 23 papers and two evening addresses. A business session was devoted chiefly to reports on the encouraging progress of the census of human and anthropoid material in American collections. In the scientific sessions, papers were presented on many different phases of physical anthropology. Dr. W. K. Gregory, R. A. Miller, M. F. Ashley-Montagu and others discussed problems of human evolution; papers by Dr. A. Hrdlička, Dr. T. Michelson and Dr. B. Oetteking were interesting contributions to the study of human races; investigations of human growth were reported by Dr. C. B. Davenport, Dr. M. Hellman and C. E. Palmer; anthropometric methods were represented in the papers of Dr. T. D. Stewart and Dr. B. Oetteking. Among other subjects presented were anatomical variations in man and comparative studies on primates. The joint session with Section H and its allied societies was particularly stimulating. Its varied scope may be indicated by mentioning the splendid report presented by Dr. G. G. MacCurdy, on the recent discoveries of Neanderthaloid skeletons in Palestine, and the instructive motion picture of a chimpanzee by H. C. Raven. On Friday evening Dr. A. Hrdlička presented the most recent results of his intensive anthropological work in Alaska.

SECTION I (PSYCHOLOGY)

(Report from John E. Anderson)

Section I held meetings from December 28 to 30. The vice-presidential address, on "The Historical De-

velopment of Response Psychology," was given by Professor Herbert S. Langfeld (Princeton University), at a joint dinner with Section Q on Wednesday evening. After outlining the history of response psychology Dr. Langfeld showed the increased significance of motor theories of consciousness. At this dinner, Professor Ernest Horn (University of Iowa), giving the vice-presidential address for Section Q on "The Problem of Meaning in Reading," emphasized the importance of semantic variations for studies of language development and of reading, and evaluated modern approaches to the problem of meaning. On Thursday afternoon, in the symposium on "Mental Development," Dr. Myrtle B. McGraw discussed the development of specific behavior during infancy and Dr. Edgar A. Doll discussed the psychological significance of cerebral birth lesions. In the remaining sessions twenty-seven contributed papers were presented, distributed as follows: Theoretical, 3; experimental, 5; physiological, 2; comparative, 1; child development, 3; effects of old age, 2; mental measurement, 7; abnormal psychology, 4.—Thorndike showed that a satisfying after-effect inserted in a series of mental connections strengthens the unrewarded connections in close proximity to it. Pratt demonstrated that new-born infants are sensitive to auditory stimulation. Miss Price showed motion pictures of infants reacting to a problem situation. Yoshioka demonstrated that young chimpanzees learn to make choice by position more easily than by brightness. Porter and Henninger reported a lack of positive relationships among measures of persistence. Luckiesh and Moss showed that nervous muscular tension incidental to reading decreases with an increase in illumination. Dwight criticized the use of the concept of organism. Maller showed the relationship between psychological measures and various socio-economic factors, while Anderson discussed the relation of socio-economic status to child care. Wechsler gave evidence that the decline in human capacities begins earlier than is currently maintained. Dr. Walter Miles showed the existence of a decrement in the performance of an industrial task as age increases.—In a joint session with Section Q, Kelley presented the results of a factor analysis of mental test scores, Hoke evaluated various techniques for eliminating cheating, Lamson reported on the high-school achievement of gifted children, and Courtis showed that means derived from cross-section studies give an inadequate picture of physical growth when compared with means derived from curves based on successive individual measures. Garvey obtained no evidence of sensitivity in the blind spot. Max and Joseph showed the absence of a relationship between handedness and heart action when the right or left arm did muscular work. Mitchell found that waking suggestion failed to affect relearning after short periods. Hunt discussed the meaning of pleasantness and unpleasantness. Johnson showed that sleep was not due to an absence of stimulation. Likert found a positive relationship between social attitudes and scholarship. Lotz discussed the relation between parent's emotional status and problem children's behavior. Tinklepaugh and Mitchell demonstrated the existence of monthly weight cycles related to menstruation. Macht and Davis showed that menotoxin, derived of menstruating women, which had been shown to be depressant for living plant tissues, sensitizes or depresses smooth muscle preparations according to dosage. Cowles presented a paper on a new pathology and treatment of the psychoneuroses, Burrow one on the fallacy of the senses and Feigenbaum one on equilibrium in normal and abnormal psychic apparatus.

SECTION K (SOCIAL AND ECONOMIC SCIENCES)

(Report from Harold Hotelling)

A program of statistical contributions to the social sciences was held on Tuesday morning, with the chair occupied by Professor W. F. Ogburn (University of Chicago), vice-president for the section. Professor Herman C. Beyle (Syracuse University) presented his work on the construction of scales measuring political behavior, using the Thurstone psychophysical technique. Professor Ogburn analyzed the 1930 census data on family composition. Dr. Dorothy Swaine Thomas (Yale University, Institute of Human Relations) spoke on "Some Individual Biases in Observation." Quick and accurate estimation of the social status of a family is possible on the basis of living-room furniture, according to a paper presented by Professor F. Stuart Chapin (University of Minnesota). The type of mental abnormality known as schizophrenia was found, in an intensive study by Professor Robert Faris (Brown University), to result directly from loneliness. Case records showed that before commitment most of the patients had been cut off for long periods from intimate, sympathetic personal contacts; many city dwellers, lonely as solitary inhabitants of remote islands, develop this malady. Professor Wilson Gee (Institute for Research in the Social Sciences, University of Virginia) gave results of an intensive study of the changes in the population of a rural South Carolina township between 1900 and 1930.

The recently organized Econometric Society, affiliated with the A. A. A. S., held two joint sessions with Section K, one with Section A and the American Mathematical Society, and one with Sections A and K and the Mathematical Association of America. At the two first mentioned of these, President Irving

Fisher presided. Professor H. T. Davis (Colorado Springs) set forth an analogy of economic variables with an elastic mechanical system, using quadratic differential forms in his statistical analysis of economic series. Dr. Edward Thiess (Technical University, Hungary) developed the theory of a type of business cycle resulting from the interval between the beginning of a productive enterprise and its fruition. Mr. Carl E. Thomas (New York Federal Reserve Bank) read a paper on community expenditures and industrial fluctuations. Mr. John P. Norton (West Haven, Connecticut) proposed that contracts be made in terms of kilowatt hours instead of dollars, to gain stability. The rapid growth in the expectation of life in the United States was traced in a paper by Dr. Louis I. Dublin and Dr. Alfred J. Lotka (Metropolitan Life Insurance Company). They discussed recent changes in incidence of the principal causes of death, with tuberculosis taking a smaller toll than ten years ago and organic heart disease a greater one. Professor Truman L. Kelley (Harvard University) described the abysmal ignorance of elementary mathematics which he had found in students of statistics. His recital of shocking cases moved Dr. Arne Fisher to exclaim, "What right have those people in a university, a drag on the professors and the serious students?" Professor J. A. Shohat (University of Pennsylvania) urged that a statistical institute is needed for teaching and research, both in the mathematical theory of statistics and in economic problems which call for mathematical inquiry. Professor Charles A. Ellwood (Duke University) spoke on the uses and limitations of statistics in the social sciences. A paper by Professor John H. Cover (Chicago) dealt with liquidation and rehabilitation of the consumer and small business.—At one of the joint sessions with the mathematicians Professor Griffith C. Evans (Rice Institute) gave the retiring vice-presidential address for Section K, on "The Theory of Money." At the other joint session with the mathematicians Dr. Walter A. Shewhart (Bell Telephone Laboratories) spoke on "Probability as a Basis of Action," emphasizing the difference between a prediction based on assumptions considered with reference to probability theory and a prediction based on assumptions that are known to be satisfied. A spirited discussion by numerous members of the large audience followed the paper and the scheduled comments by Professor E. V. Huntington (Harvard University) and Professor Harold Hotelling (Columbia University). Dr. Max Sasuly (Brookings Institution) described a method of smoothing economic time series by moving averages.—The joint symposium on "Stabilization of Employment," in which Sections K and M took part, is summarized under Section M in this report.

SECTION L (HISTORICAL AND PHILOLOGICAL SCIENCES)

(Reports from Joseph Mayer and F. E. Brasch)

The historical and philological program at Atlantic City was probably the most significant in the history of Section L. Among those participating were Dr. William H. Welch, Dr. Harvey Cushing and Dr. Clark Wissler, and among the high lights of the sessions the following items were outstanding: China was pointed to as the mother of many scientific discoveries which are as a rule credited to Western learning, such as the principle of the circulation of the blood, the evolutionary hypothesis, and as possible source, by way of Syria and Persia, of the algebra of al-Khowarizmi. The reintroduction of Western learning into China to-day was apparently looked upon as the beginnings of an Oriental Renaissance.—Equally interesting was the presentation of data on the excellent examples of the dental workmanship of the old and new worlds in ancient time. The same materials, such as gold and silver, the same type of instruments and similarly successful surgical operations upon the teeth, as are used or as exist to-day were in evidence among the Etruscans in 1000 B.C. and among the Pre-Inca Indians of the new world. In fact, the successful transplanting and implanting of teeth discovered in those ancient times is now a lost art.—A most illuminating session was that on biography, in which it was clearly indicated that psychology, genetics and anthropology have much to contribute to a proper understanding of scientific biography. It was suggested, for example, that additional information required of every school child bearing upon physiology, heredity and environmental characteristics might be readily utilized for more properly developing the biographies of the great, and also for providing a cross section of what might be considered representative in a particular country or region at a given time.—The session on primitive linguistics provided additional interesting information, especially that bearing on the drum language of West Africa, the inference being drawn that by means of signals, beaten out upon specially constructed drums, messages quite similar in detail to written language are transmuted into sound and rhythm and communicated over a wide area. Especially interesting here was the suggestion that music and language are thus blended together, the signals representing thought communication at one time and musical scores at another.—The session on the history of medicine was especially outstanding. Among other things discussed was the famous Edwin Smith Surgical Papyrus, in which 48 surgical operations employed among the ancient Egyptians are minutely described. This papyrus, unknown until relatively recent times, provides an essential source book for ancient medical

procedure.—The sessions were well attended, the one on History of Medical Science drawing an audience of more than 150, and the discussions were always significant and illuminating.

SECTION M (ENGINEERING)

(Reports from N. H. Heck, Howard Hotelling and Wm. F. Diehl)

Section M took part on Wednesday in two joint sessions on the "Stabilization of Employment," with Section K and the Econometric Society. The Philadelphia section of the Institute of Radio Engineers arranged a joint session with Section M for Thursday afternoon. The retiring vice-presidential address for this section was given at the Thursday evening general session, by Professor Dexter S. Kimball, of Cornell University, whose topic was "The Social Effects of Mass Production." Dean Kimball's address has been published in SCIENCE for January 6. At the symposium on "Stabilization of Employment" invitation papers were given by Professor Irving Fisher, James W. Angell, Alvin Hansen, Dr. C. F. Kettering, Professor Dugald C. Jackson, Professor Walter Rautenstrauch, Elmer J. Working, Gerard Swope, Dr. H. L. Rietz, Leo Wolman, Dr. John Lyle Harrington, W. N. Loucks, Dr. Karl T. Compton and Royal Meeker. Fisher showed a close correlation between price changes and subsequent unemployment. Angell emphasized excessive post-war industrial expansion through bank credit as a principal cause of the present depression. Hansen ascribed the depression largely to great erratic international movements of capital while it was being attempted to maintain artificial high price levels. Kettering held that we suffer not from over-production but from inadequate distribution and that the necessity for continued constructive change must always be present with machines, so that we need not fear the latter. Jackson gave emphasis to the thought that the continuous, noncyclic contributions of research and invention to human welfare necessarily result in great social changes that require continued readjustment; undesirable features must be corrected, but the advantages of the machine age must not be lost. Rautenstrauch called attention to the fact that the capacity for energy conversion per man is now a hundred times as great as in pre-machine times; the resulting highly integrated social mechanism calls increasingly for scientifically designed control. Working showed how agricultural employment had maintained a remarkable degree of stability, as compared with industrial employment, but agriculture had to pay for this advantage by accepting earlier and more drastic price reduction. Swope held the view that workers must be assured of a minimum degree of employment, that adequate reserves should be established and maintained to this end, by cooperation of employers and employed, but without demands upon the state. Rietz's paper dealt with actuarial aspects of unemployment insurance. Wolman emphasized the inherent weaknesses of plans aiming to stabilize business through control of public works. Harrington and Loucks both discussed public works as an important factor in the stabilization of employment. Compton pointed out that legislation for the reduction and relief of unemployment is inevitable, being specially directed toward the improvement of facilities for cooperation among the various groups that are concerned. Meeker's witty talk, on "The Outlawry of Unemployment," concluded with the statement: "The abolition of both war and unemployment must be achieved if the good things of existing civilization are to be retained and another thousand years of Dark Ages is to be avoided."

The papers and the discussions that made up this important and timely symposium are being brought together and edited to form a book, which is to be published about February 25, 1933. The writing will be clear and readable. The subject is of interest to every one. The authors' names are assurance of reliability. The book may be ordered from the office of the permanent secretary, A. A. A. S., Smithsonian Institution Building, Washington, D. C. The price, $2.50 before publication, afterwards $3.50.

In the program of papers arranged by the Philadelphia Section of the Institute of Radio Engineers, an introductory talk by Professor Dugald C. Jackson, vice-president for Section M, was followed by three papers bearing on musical aspects of radio transmission and reception, with suggestions for improvement, which were presented by C. N. Weyl, A. V. Loughren and C. B. P. Aiken. Richard Kovacs gave a paper on electricity in the treatment of disease and in the alleviation of pain, presenting the history of this topic and emphasizing the evils of the attempted use of electric methods by medical quacks. F. Massa discussed recent developments in ribbon telephone receivers.

SECTION N (MEDICAL SCIENCES)

(Reports from W. W. Cort and Albert L. Midgley)

The program arranged by Section N consisted of a series of symposia. All were well attended, with numbers varying from 50 to over 200, and interesting discussions developed at each session. The Wednesday morning symposium, on "Tuberculosis," was under the leadership of Dr. William H. Park, vice-president for Section N. In the first paper on this symposium Miss Lucy Mishulow discussed the value of culture methods of diagnosing tuberculosis by the use of the Bordet-Gengou and Lowenstein mediums. Miss Camille Kereszturi then outlined the results from

a study of the value of the BCG vaccination in protecting young children in tuberculous homes against tuberculosis, concluding that this vaccine seems to have some protective value. Dr. M. C. Kahn gave a summary of his studies on the life cycle of the tubercle bacillus by the method of isolating single cells; his results on the modification of strains were particularly striking. The symposium ended with discussions by Dr. E. L. Opie and Dr. Park on the question of immunization in tuberculosis.—The Wednesday afternoon symposium, on the "Hypophysis Cerebri," was under the direction of Dr. John J. Abel, president of the American Association. At this meeting were present a large number of the most prominent workers in the United States in this field. The meeting had a very auspicious beginning in the presentation to Dr. Abel, by Dr. D. D. Jackson, of the Philip A. Conne Medal of the New York Chemists Club. Unfortunately, Dr. H. M. Evans, who was to give the first paper of this symposium, on the hormones of the anterior hypophysis, was unable to be present on account of illness; Dr. G. W. Corner gave a summary of Dr. Evans' results. Dr. P. E. Smith discussed the relationship between the pituitary and the gonads, showing a variability among different species of animals in the response to the anterior pituitary gonad-stimulating extracts and to the anterior pituitary-like hormone from pregnancy urine. Several different types of tests showed that the anterior pituitary-like hormone in human pregnancy blood reacted similarly to prolan and differently from true anterior pituitary extracts. Dr. E. M. K. Geiling gave a summary of the newer developments of the last few years in the study of the posterior lobe of the hypophysis cerebri, showing that a number of physiological properties of a heterogenous character have been ascribed to extracts prepared from this gland and emphasizing the importance of the possible rôle of the posterior lobe hormones as regulators of metabolites between the blood and the tissues. In the discussion Dr. Harvey Cushing drew on his wide clinical experience and pointed out the rôle of the various types of cells in the anterior lobe in relation to types of tumors and their resultant pathological pictures. Dr. Abel closed the discussion with an analysis of the difficulties associated with the preparation of active principles from this gland and their establishment as chemical entities. Other well-known workers in this field who took a part in the discussion were Drs. Kamm, Riddle and Collip.—The symposium on "Filterable Viruses and Filterable Virus Diseases" was held on Thursday. Dr. R. R. Hyde, the first speaker, defined filterable virus diseases as a group distinctly separated from those caused by protozoa and bacteria; their causative agents are very minute, cabable of passing filters with the most minute pores and producing well-defined and characteristic inclusion bodies. Dr. E. B. McKinley gave a classification of the various diseases which have been placed in the filterable virus group and discussed the characteristics of the causative agents, emphasizing their mode of reproduction. He pointed out that up to the present time, in spite of well-planned attempts, no one has been able to cultivate these viruses except in the presence of living tissue. Dr. E. V. Cowdry dealt with micro-incineration, a new technique for the study of viruses, especially application of this method to the study of the virus of yellow fever. Dr. Max Theiler gave a summary of recent investigations on the susceptibility of common laboratory animals to the virus of yellow fever, with an account of his own researches on the transfer of this virus to white mice and its localization in the brain; he pointed out the progress thus made possible in the development of a protective serum against yellow fever. Dr. T. M. Rivers emphasized particularly the pathology of the virus diseases, especially in relation to serum therapy. In the last paper on this symposium Dr. W. H. Park gave a general discussion of the epidemiology, prevention and treatment of poliomyelitis; statistical analysis of a thousand cases gave no evidence that the serum treatment had in any way influenced the development of paralysis or other results of this disease.—On Thursday evening there was a symposium on medical history, at a joint session with Section L, the American College of Dentists and the History of Science Society. Dr. William H. Welch presided. The first paper was the address of the retiring vice-president of Section N, Dr. H. T. Karsner, entitled "Mediaeval Guilds of Medical Interest." Dr. Karsner gave a very interesting account of the development and characteristics of the various guilds, such as those of the barbers, physicians and others that had relation to medicine. Dr. H. E. Sigerist gave an analysis of the Edwin Smith Surgical Papyrus, the oldest surgical writing known. According to his interpretation these writings were probably for the instruction of army surgeons, and showed no evidence of the pursuit of pure science. Dr. Harvey Cushing discussed the influence of the anatomical tables of Ercole Lelli, both on art and anatomy. The symposium closed with a discussion, by Dr. W. H. Welch, on the life and work of Antony van Leeuwenhoek, in honor of the tercentenary of Leeuwenhoek's birth.

The initial appearance of dentistry, through the American College of Dentists, in affiliation with the American Association for the Advancement of Science, marks a new era in dental history, in that a scientific program in this subject was offered in conjunction with those of other organizations in the field of science. This alliance has more than a passing significance, for, as was emphasized by this meeting,

the dental profession has an important part to play in the promotion of research. By no means content to confine their activities to the mechanical and esthetic phases of the profession, workers in dental science are keenly alert to the importance and value of its biological aspects. The fellows of the American College of Dentists are greatly appreciative of this opportunity to present a program at Atlantic City.—The program, which had been arranged by a committee of which Dr. William J. Gies (Columbia University) was chairman, included both theoretical and practical discussions on a high scientific and intellectual level. There were sessions on Friday morning, afternoon and evening. It was opened by Dr. W. H. Park, vice-president for Section N. The need of dental research was discussed by E. H. Hatton (Northwestern University). The cause and prevention of mottled enamel, a preventable endemic lesion of the teeth, was discussed by F. S. McKay (New York) who showed how this disease points to a civic responsibility that closely allies dentistry with medicine and with the public health movement. A paper on the experimental production of typical dental caries in animals was given by Theodor Rosebury (Columbia University), who pointed out the importance of such experimental work in throwing light on the phenomena of tooth decay in man. Professor J. L. T. Appleton, Jr. (University of Pennsylvania) presented a new plan for the treatment and management of infected teeth, suggesting avenues of thought that should lead to progress in the eradication of dental foci of infection and consequently in the elimination of related disease conditions elsewhere in the body. An interesting discussion of dental and facial prosthesis, by V. H. Kazanjian (Harvard University), indicated a field of medico-dental study that should give hope and encouragement to those afflicted with discomfort, disability and deformity through accident to or disease of the tissues of face and jaws. Orthodontic problems and the use of x-ray silhouettes in tracing facial growth, by B. Holly Broadbent (Western Reserve University), diet as related to the development of osseous tissues of jaws and face in the American Eskimo, by L. M. Waugh (Columbia University), aids offered by scientific research toward the improvement of dental restorations, by Wilmer Souder (U. S. Bureau of Standards), morphological change in mucous membrane of edentulous areas of the alveolar process, by W. H. Wright (University of Pittsburgh), were other topics discussed. On Friday evening there was a dinner session, at which three constructive papers were presented, as follows: "Status of Dental Research," by U. G. Rickert (University of Michigan), "Microscopic Research on Periodontal Diseases," by Rudolf Kronfeld (Loyola University, Chicago), and "Field Studies of Human Tooth Decay in Primitive Districts Providing Immunity," by Weston A. Price (Cleveland, Ohio). On Friday afternoon, at a general session of the American Association, Dr. R. W. Bunting (University of Michigan) gave an interesting lecture on recent developments in the study of dental caries.

SECTION O (AGRICULTURE)

(Reports from P. E. Brown, H. B. Tukey, H. C. Moore, Paul Moore)

Section O and the American Society of Agronomy met in joint session on Wednesday, with Vice-president J. H. Gourley presiding. In the absence of the secretary, due to illness, Dr. R. P. Thomas (University of Maryland) served as secretary *pro tem.* The program consisted of a symposium of invitation papers on "Nitrogen in Relation to Crop Growth and the Use of Nitrogenous Fertilizers." The subjects discussed included nitrogen carriers in relation to plant growth, the use of ammonium and nitrates by plants, the effects of previous cropping on forms of nitrogen in soil, the rôle of microorganisms in the liberation and immobilization of nitrogen in soil, the occurrence of Azotobacter in peat soils, nitrogen fertilizers for cotton and truck soils, the assimilation of different forms of nitrogen by grasses and clovers, factors affecting the choice of nitrogen fertilizers, the use of nitrogen as a top dressing for wheat and reactions of ammonifying cultures of cottonseed meal. In the absence of Retiring Vice-president C. G. Williams, his address, on "Fifty Years of Experiment Station Work," was read by title only.

The twenty-ninth annual meeting of the American Society for Horticultural Science was held in four sessions, including a joint session with the American Society of Plant Physiologists. One hundred and sixty-two papers were presented, more than at any previous meeting in the history of the organization. Much interest was shown in the various phases of growth and nutrition of fruit trees, pruning and fungicides, stocks and vegetative propagation, small fruits, breeding and pollination, varietal behavior of fruits in cold storage, vegetable crops and ornamentals. The physiological view-point was dominant and many different questions of plant physiology received attention. The address of the retiring president, Dr. H. A. Jones (University of California), reviewed vegetable breeding at Davis, California. Dr. Laurenz Greene (Purdue University) was elected president for the year 1933.

The Atlantic City meeting of the Potato Association of America was opened on Thursday morning by President J. R. Livermore, who spoke on bud selection as a means for the improvement and development of better strains of seed potatoes. New developments in spraying were discussed by F. M. Blodgett (Cornell University), who reported maximum yields for a 4-year period from Rural potatoes in upstate New

York, secured by spraying 75–80 pounds of copper sulfate per acre, in the form of Bordeaux mixture, with pressure of about 400 lbs. As the amount of lime in the mixture was decreased, better yields were obtained. Dr. Harry L. Gui (Ohio Experiment Station, Wooster) described the life history of the potato scab-gnat and recommended corrosive sublimate or hot formalin as a seed-potato disinfectant; other control measures considered were crop rotation, addition of humus to the soil, and maintaining the pH value of the soil around 5.0 or less. Results of fertilizer tests at the Rhode Island Experiment Station were presented by Professor T. E. Odland, indicating the desirability of relatively high potash and low nitrogen content in fertilizer; variations in phosphorus content did not affect the yields as much as variations in nitrogen and potash content. A malnutrition trouble in potato plants in the region of Norfolk, Virginia, was described by R. L. Carolus; it caused stunted growth, yellowing of foliage and marked deficiencies in nitrogen and magnesium, accompanied by depressed yields, and it was associated with a low pH value and a low organic-matter content of the soil. Results of fertilizer placement tests, as conducted in Maine, Michigan, New Jersey and Virginia, were reported by Dr. W. H. Martin (New Jersey Experiment Station) and B. E. Brown (U. S. Department of Agriculture, Office of Soils Investigations).—Seed-potato certification problems were discussed at the Friday morning session. The committee on this subject presented standards for field and car inspections and urged their adoption in seed certification. The Potato Association voted its approval of these standards, which were also approved by the seed certification officials present. Legislative measures were discussed for protecting the certified seed industry. The Friday afternoon session was devoted to potato marketing problems. William Stuart presented a résumé of recent improvements in potato growing and marketing. Washing, grading and marketing potatoes in 15-pound sacks was the topic discussed in a paper by R. A. Porter (Elba, N. Y.). Daniel Dean outlined changes that have occurred in the potato industry of the United States in the past 60 years; rapid development of new potato-producing areas, such as those of Idaho, Aroostook County, Maine, and the South, has led to the use of better grading and marketing methods in the older potato districts. The work of the Interstate Potato Committee was described by A. E. Mercker (U. S. Bureau of Agricultural Economics), who stated that the committee has, in the last 4 years, enabled growers in the southeastern states to regulate their acreage so as to increase their profits.—The Potato Association adopted the following resolution:

Whereas, the Potato Association of America is indebted to the American Association for the Advancement of Science for certain services rendered and accommodations provided; it is therefore *resolved* that the association in convention assembled offers its sincerest appreciation to the American Association for the Advancement of Science for its cooperation in the planning of this annual meeting.

At a meeting of the Board of Governors of the Crop Protection Institute, held on December 28, Dr. W. C. O'Kane said that, notwithstanding the depression, the institute had been able to find much support, closing the year with as much productive work on hand as it had had at any time in its history. This year's work, on 16 research projects, was conducted mainly at the agricultural experiment stations of Washington, Iowa, Illinois, Ohio, Delaware, New Jersey, New Hampshire and Massachusetts. The secretary-treasurer, Paul Moore, reported receipts for the year of $44,198.54.

SECTION Q (EDUCATION)

(Report from Willis L. Uhl)

Sessions of Section Q were held from December 27 to 29. Cooperative research, as conducted by the Middle States Association of College and Secondary Schools, was presented by Dr. E. D. Grizzell, and means for disseminating the results of research were discussed by Dr. Arthur B. Moehlman. Professor L. A. Pechstein summarized an investigation showing that personality topics are dominant in courses in psychology in high schools. The period of tenure of college teachers, reported upon by Professor Norman MacD. Grier, averages about seven years. Personality tests of teachers, reported upon by Dr. Gordon Hendrickson, showed no administrative values of such tests, and age, marital status and degrees held were apparently without significant bearing on test scores. That biological superstitions can be eliminated by specific teaching was reported by Professor Otis W. Caldwell. Regional differences in achievement among pupils in New York City were presented by Dr. J. B. Maller. The size of measurable error in college entrance requirements is greatest for foreign-language units, as reported by T. Ernest Newland and Charles McD. Morris. The attainments of students using a simplified typewriter keyboard were discussed by Dr. Willis L. Uhl and Dr. August Dvorak, who showed a saving of more than a year of the usual two year course. A symposium on general educational problems of mathematics and physics was led by Dr. E. R. Hedrick, Dr. W. B. Carver and Dr. F. K. Richtmyer. At a joint dinner with Section I, Professor Ernest Horn gave an address on the problem of meaning in reading, in which it was shown that the many different meanings of certain words and small groups of words introduce great difficulty in learning to read effectively.

ORGANIZATIONS RELATED TO THE ASSOCIATION AS A WHOLE

(Reports from Jennie Hall, Edward Ellery, Howard Richards, H. R. Nelson, Agnes Z. Hill)

The American Nature Study Society held its twenty-fifth annual meeting on Tuesday, Wednesday and Thursday. The sessions were of unusual interest, with attendance which varied from about 25 at the first session to 75 at the last. The Tuesday sessions were devoted to phases of service in knowing nature and to methods of stimulation and direction of interests in the phenomena of nature. The Wednesday morning session, under the chairmanship of Dr. Otis Caldwell (Teachers College, Columbia University), presented "A Socratic Discussion: The Responsibilities of Our Society." In the first half of the Thursday morning session the papers and discussions dealt with matters related to the development of nature training of teachers and children. Then an illustrated talk was given by Dr. H. C. Bryant (U. S. National Park Service), on the educational work carried on by the U. S. National Park Service, and Arthur N. Pack (Princeton, N. J.) showed unusually instructive and interesting motion pictures of "Grizzly Bears, Glaciers and Whales in Alaska." A business meeting was held on Wednesday afternoon. An exhibition of illustrative material was a feature of the meeting. The annual dinner of this society occurred on Wednesday evening, with an attendance of 60, followed by an entertaining illustrated lecture by Dr. G. Clyde Fisher (American Museum of Natural History, New York City), who spoke on his study of Crater Canyon, Arizona, and his airplane view of the recent solar eclipse.

The 33rd annual convention of the Society of the Sigma Xi was held on Wednesday. Two new chapters had been organized in the year just closed, one at Western Reserve University and one at Princeton University; also a new Sigma Xi club of 24 members, at Yenching University (Peiping, China). The society now has 60 chapters, with a total membership of approximately 12,000, and 31 clubs; the total membership of the society, including associates, is approximately 26,000. About 1,500 members and associates are added each year. An unexpended balance of about $3,000 over budget expenses was reported. Six of the chapters presented foreign scientists to their membership and public during the year; the chapter at the University of Minnesota has continued its plan of holding symposia, the last one being on "Evolution and Civilization"; its meetings were attended by a total of 12,700 people. The chapters at Pennsylvania, Colorado, Virginia, Wisconsin and Minnesota award research prizes; the Rochester Chapter holds an annual Sigma Xi Day, with a forenoon program for school children, an afternoon exhibition of current scientific research and an evening dinner with an address.—Professor A. O. Leuschner (University of California) was elected to the executive committee for five years, and Donald H. Sweet (Chicago) was elected to the alumni committee, for five years. The annual Sigma Xi dinner was well attended. The 11th annual Sigma Xi lecture, given under the joint auspices of the society and the A. A. A. S., was given by Professor Harlow Shapley (Harvard University) on "Fact and Fancy in Cosmogony."—New chapters were authorized at Duke University and at the University of California at Los Angeles. It was decided to hold a special meeting of the society in connection with the approaching Chicago meeting of the American Association. The semi-centennial meeting of Sigma Xi is to occur in 1936, at Ithaca, in connection with the Rochester meeting of the A. A. A. S., to be held in the summer of that year.

The Metric Association met on Thursday, under the presidency of Dr. A. E. Kennelly, with a program of several talks on the metric system and its progress in the United States, an inspection trip and a dinner. A resolution was adopted recommending to the United States Congress that the terms "metric yard," "metric quart" and "metric pound" be authorized for use by the United States Government as synonymous with meter, liter and half-kilogram.

The Gamma Alpha Graduate Scientific Fraternity held its annual council meeting and convention on Wednesday and Thursday, with more than 40 members present. A committee was appointed to consider ways and means by which Gamma Alpha might take more active part in the general program at winter meetings of the American Association. Officers for 1933 are: *President,* R. H. Wetmore; *secretary,* H. R. Nelson; *treasurer,* S. P. Miller; *editor,* C. F. Scofield; *recorder,* D. S. Welch.

Sigma Delta Epsilon, graduate women's scientific fraternity, held two sessions at Atlantic City. At the Wednesday morning breakfast, to which all women interested in science were invited, Dr. Abby Turner (Mount Holyoke College) discussed "Research in Women's Colleges, Its Trials and Joys." The following officers were elected for 1933: *President,* Edna Mosher (Adelphi College); *vice-presidents,* Janet Scott (*Chemical Abstracts,* Columbus, Ohio) and Mary Carlson (Northwestern University); *treasurer,* Katherine Jeffers (University of Missouri); *secretary,* Agnes Zeimet Hill (University of Wisconsin).

Pi Gamma Mu, an honor society in the field of the social sciences, held a luncheon on Thursday, at which the speakers were: Dr. Franz Boas (Columbia University, retiring president, A. A. A. S.), Emory R. Johnson (University of Pennsylvania) and Professor Harry T. Collings (University of Pennsylvania).